CLINICAL PROFILE AND OUTCOME OF FEBRILE NEUTROPENIA IN PEDIATRIC ONCOLOGY PATIENTS

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Submitted By

DR MITALI SHARMA

DEPARTMENT OF PAEDIATRICS
DAYANAND MEDICAL COLLEGE AND HOSPITAL
LUDHIANA, PUNJAB

DECLARATION BY THE CANDIDATE

I hereby declare that the thesis entitled "**CLINICAL PROFILE AND OUTCOME OF FEBRILE NEUTROPENIA IN PEDIATRIC ONCOLOGY PATIENTS**" submitted towards partial fulfillment of the requirements for the award of **MD in Paediatrics** degree to BFUHS is a compilation of original work carried out by me under the supervision of **Dr. Deepak Bhat**, Professor, Department of Paediatrics and **Dr. Shruti Kakkar**, Associate Professor, Department of Paediatrics. No part of this thesis has formed the basis for the award of any degree previously.

_____

Dr. MITALI SHARMA
Department of Paediatrics,
Dayanand Medical College & Hospital,
Ludhiana, Punjab

Date:

Place:

CERTIFICATE OF SUPERVISORS

This is to certify that the work incorporated in this thesis entitled "**CLINICAL PROFILE AND OUTCOME OF FEBRILE NEUTROPENIA IN PEDIATRIC ONCOLOGY PATIENTS"** has been carried out by **Dr. Mitali Sharma** under our direct supervision. The data incorporated in this thesis is original and genuine and has been carried out by the candidate herself.

Signature of Supervisor

Dr. Deepak Bhat
Professor
Department of Paediatrics
DMC&H, Ludhiana

Signature of Co-Supervisor

Dr. Shruti Kakkar
Associate Professor
Department of Paediatrics
DMC&H, Ludhiana

Date:

ENDORSEMENT BY THE HEAD OF THE INSTITUTE

This is to certify that the thesis entitled "**CLINICAL PROFILE AND OUTCOME OF FEBRILE NEUTROPENIA IN PEDIATRIC ONCOLOGY PATIENTS"** is a bonafide research work done by **Dr. Mitali Sharma** under the supervision of **Dr. Deepak Bhat**, Professor, Department of Paediatrics and **Dr. Shruti Kakkar**, Associate Professor, Department of Paediatrics and in this institution.

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Dr. Sandeep Puri
Principal
DMC&H, Ludhiana

Date:

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Signature

Dr. Mitali Sharma
Department of Paediatrics,
Dayanand Medical College & Hospital,
Ludhiana, Punjab - 141001

Date:

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Dedicated

to

my Family,

friends

&

Teachers

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ABBREVIATIONS

AE	Adverse Event
ALK+ALCL	Anaplastic large cell lymphoma
ALL	Acute Lymphoblastic Leukemia
ALP	Alkaline Phosphatase
AMC	Absolute Monocyte Count
AML	Acute Myeloid Leukemia
ANC	Absolute Neutrophil Count
B-ALL	B-Acute Lymphoblastic Leukemia
BSI	Blood stream infection
CBC	Complete Blood count
CFT	Capillary filling time
CI	Confidence interval
Cl	Chloride
CLABSI	Central Line associated Blood stream infection
CNS	Central Nervous System
CRP	C-reactive protein
CSF	Cerebrospinal fluid
CT	Computerised Tomography
CVS	Cardiovascular system
D.BILIRUBIN	Direct Bilirubin
DLC	Differential Leucocycte Count
ED	Emergency Department
fL	FemtoLitre
GCS	Glasgow Coma Scale
gm/dl	gram per decilitre
H	hours
Hb	Haemoglobin
i.e.	that is
IBI	Invasive Bacterial Infection
ICU	Intensive Care Unit
IFD	Invasive Fungal Disease
IFI	Invasive Fungal Infection
IQR	Inter-quartile Range
K	Potassium
LOS	Length of Stay
LRI	Lower Respiratory Tract Infection
MCH	Mean Corpuscular Hemoglobin
MCHC	Mean Corpuscular Hemoglobin Concentration
MCV	Mean Corpuscular Volume
mg/dl	milligram per decilitre
mg/L	milligram per litre
min	Minutes
mm^3	millimeter cube
mmol/L	millimol per litre
MRI	Magnetic Resonance Imaging
MRSA	Methicillin resistant Staphylococcus aureus
Na	Sodium

NE	Neutropenic Enterocolitis
NEC	Neutropenic Enterocolitis
NPV	Negative Predictive Value
NSAID	Non-Steroidal anti-inflammatory drug
OR	Odds ratio
PC	Packed Cell
PCT	Procalcitonin
PCV	Packed Cell Volume
PDSA	Plan Do Study Act
Pg	Picogram
PICC	Peripherally Inserted Central Catheter
PPV	Positive Predictive Value
QI	Quality improvement
QOC	Quality of care
RBC	Red Blood Cell
RDP	Random Donor Platelet
RDW	Red Cell Distribution Width
ROC	Receiver Operator curve
S.albumin	Serum albumin
SBP	Systolic Blood Pressure
SD	Standard Deviation
SDI	Symptom to Door Interval
SGOT	Serum Glutamic Oxaloacetic Transaminase
SGPT	Serum Glutamic Pyruvic Transaminase
S_N	Sensitivity
SOFA	Sequential Organ Failure Assessment
S_P	Specificity
T.BILIRUBIN	Total Bilirubin
T.Proteins	Total Proteins
T-ALL	T-Acute Lymphoblastic Leukemia
TLC	Total Leucocycte count
TLC	Total Leucocycte Count
TTA	Time to Antibiotic administration
uL	micro Litre
URI	Upper Respiratory Tract Infection
UTI	Urinary Tract Infection
WBC	White Blood Cell
y	years

ABSTRACT

INTRODUCTION: Febrile neutropenia is development of fever in a patient with low neutrophil count which can rapidly progress to sepsis, septic shock and haemodynamic instability. It remains an important cause of morbidity and mortality in children suffering from malignancy.

AIM OF STUDY: 1. To study the clinical profile of children presenting with febrile neutropenia.

2. To study the time to antibiotic administration in children with febrile neutropenia.

MATERIALS & METHODS: This is a prospective observational study which was conducted in the department of Pediatrics, Dayanand Medical College and Hospital, Ludhiana. All the children with an underlying malignancy who develop febrile neutropenia and require hospitalisation were taken in the study after taking due consent.

RESULTS: A total of 96 episodes of febrile neutropenia were studied in 71 patients. The commonest age group/diagnosis/phase of chemotherapy/ presentation/system involved was <5 years/ALL/Intensive phase/outpatient/GIT respectively. A lower TLC/ANC at admission was associated with longer time to recovery, morbidity and mortality. Febrile neutropenia episodes who had a delay in receiving antibiotics had a longer duration of hospital stay, increased requirement of PICU/inotropes/ventilation/blood products and took a longer time to recovery and were associated with higher percentage of mortality as compared to episodes who received antibiotics within the golden hour.

CONCLUSION: Time to antibiotics influences the outcome in terms of requirement of resuscitation, intensive care, duration of hospital stay & morbidity and death. Assessing the time to antibiotics would help to intervene appropriately by targeting appropriate reasons for delay.

KEYWORDS: Febrile neutropenia (FN), Absolute neutrophil count (ANC), Golden hour, Time to antibiotics, Delay, Non-delay.

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INTRODUCTION

Out of all cancers in India , 1.6 to 4.8% are seen in children below 15 years of age.[1] The incidence of childhood cancer in most populations in the world ranges from 75 to 150 per million children per year and in India, incidence ranges from 38 to 124 per million children per year and the reported incidence of childhood cancer in India in males is higher than in females.[2,3,4] Leukemia is the most common childhood cancer in India with proportion varying between 25 and 40% and 60-85% of all leukemias reported are acute lymphoblastic leukemia (ALL).[1] The incidence of febrile neutropenia varies between 10 and 50% in solid tumours and is reportedly ≥80% in haematological malignancies. Febrile neutropenia accounts for approximately 40-50% of total cost of hospitalization in cancer care and results in mortality rates between 3% and 20%, depending on risk factors. It reduces the quality of life for the patient, and also increases the burden on the healthcare system.[5]

The 5 year survival rate of acute childhood leukemia is about 80% in western population, compared to 37-40% in India.[2,6] Reasons for poor outcome in our country are multifold - inaccessible diagnosis and treatment, limited hospital beds and manpower, late stage presentation, infection related deaths, abandonment of treatment due to higher costs resulting from prolonged hospital stays and intravenous antibiotics being few of them.[7,8,9] Febrile neutropenia is one such modifiable cause of poor outcome, which continues to be an important cause of mortality and morbidity. A thorough evaluation of clinical profile of these patients would help to develop strategies or policies to reduce mortality in vulnerable patients.

The purpose of our study was to evaluate the incidence, demographic characteristics and clinical profile of children with febrile neutropenia. As febrile neutropenia is a leading cause of morbidity and mortality in children with malignancies, this study will help us determine the parameters associated with worse outcome in these children and

would be useful in identifying patients that need more intensive treatment. In the management of childhood cancers, prompt treatment of febrile neutropenia (FN) constitutes an important aspect, especially in developing countries where the mortality in pediatric cancer secondary to infections, is higher compared to high-income countries. [10,11]

As we make progress in reducing infection associated deaths in children in India, it is not acceptable to ignore children with malignancies, who have an increased likelihood of cure with appropriate treatment. Identifying the preventable causes that may lead to morbidity and mortality in patients with malignancies is as important as in any other infection associated diseases. Our study evaluated the clinical profile of oncology patients with febrile neutropenia and looked at such modifiable risk factors.

Febrile neutropenia: Febrile neutropenia is defined as single oral temperature of ≥101°F or a temperature ≥ 100.4°F sustained over a one hour period with neutropenia i.e ANC < 500/mm³ or a predicted decrease to <500/mm³ over the next 48 hours.[12,13,14]

Bacteremia: Bacteremia is defined as at least one positive blood culture, irrespective of the pathogen detected, using a qualitative automated culture system.[15]

CLABSI (Central line associated blood stream infection): CLABSI is defined as a laboratory confirmed bloodstream infection not related to an infection at another site that develops within 48 hours of central line placement.

Neutropenic enterocolitis: NEC is an acute life threatening condition characterized by transmural inflammation of the caecum, often with involvement of ascending colon and ileum, in patients who are severely immunosuppressed.[16] The affected gut becomes thick walled, with

mucosal ulceration, fibrin exudates, and partial to full thickness haemorrhagic necrosis.

Sepsis: Sepsis is defined as serious organ dysfunction caused by a dysregulated host response to infection. Organ dysfunction is represented by an increase in SOFA score of 2 points or more.[17]

- GCS score <15
- SBP ≤ 100 mm Hg
- Respiratory rate ≥ 22/min

Septic Shock: Septic shock is defined as a subset of sepsis in which there is a requirement of a vasopressor to maintain a mean arterial pressure ≥ 65 mmHg and serum lactate level greater than 2 mmol/L in the absence of hypovolemia.[17]

Fungal infection: Fungal infection [18,19] can be defined as possible, probable and proven on the basis of –

Host criteria	Clinical criteria	Mycological criteria
1. Recent history of neutropenia 2. Allogenic stem cell transplant 3. Prolonged use of corticosteroids 4. Inherited severe immunodeficiency 5. On immuno-suppressants	1. Lower respiratory tract fungal infection 2. Tracheo-bronchitis 3. Sino-nasal infection 4. CNS infection 5. Disseminated candidiasis	1. Direct tests-Cytology, Direct microscopy, or culture positive. 2. Indirect tests-detection of antigen (Galactomannan) or cell wall constituents.

Possible fungal infection- is said to be present in cases which meet criteria for host factor and clinical criteria.

Probable fungal infection- is said to be present in cases which meet criteria for host factor, clinical criteria and mycological criteria.

Proven fungal infection- is said to be present in cases which meet probable fungal infection criteria along with detection of fungus by histological analysis or a positive culture of a specimen of tissue taken

from site of disease or detection of capsular antigen in CSF or a positive result of an India ink preparation of CSF.

Fever is the only sign of occult infection in the neutropenic host.[17]. Rectal temperature measurement should be avoided in neutropenic patients to avoid the possibility of introducing infection through mucosal trauma.

Risk factors[17,20] for serious infection in children with malignancy includes :

- Chemotherapy induced neutropenia
- Central venous catheters
- Functional neutropenia (Haematological malignancies that impair phagocytosis and killing of pathogens, even if ANC is normal).
- Breakdown of skin and mucosal barriers (eg. mucositis)
- Altered humoral and cellular immunity, particularly if neutropenia is anticipated to last for > 7 days.

Infectious causes of fever: In children with chemotherapy-induced neutropenia, the rate of documented infection ranges between 10 and 40%.[21-26] The most common documented infection is bacteremia, which accounts for approximately 20 to 50%. [27-31] Other sites of infection include gastro-intestinal tract (oral or intestinal mucositis), upper and lower respiratory tract, urinary tract, and skin and soft tissues.[32-34]

Gram-positive and gram-negative organisms are frequently isolated from blood in children with fever and chemotherapy-induced neutropenia. [9,21,35] With the increased use of prophylactic antimicrobials and indwelling venous catheters, there has been a general shift towards dominance of gram positive organisms.[36]

Gram positive bacteria: The most common gram positive pathogens are coagulase negative staphylococci, viridans streptococci, and Staphylococcus aureus. [9,21,26,29,37]

Gram negative bacteria: Aerobic gram negative bacilli constitute about one-third to one-half of bacteremic episodes, with E.coli, Klebsiella, Pseudomonas, Acinetobacter and Enterobacter among the common isolates. [9,21,26,29,37]

Fungi: Candida, Aspergillus, Zygomycetes, Cryptococcus, Fusarium are common fungal infections seen in neutropenic patients. [38-42]

Viruses: Respiratory viruses, Herpes simplex virus, and Varicella zoster virus are common viral infections in children with febrile neutropenia. [43-50]

Non-infectious causes of fever:- Drug fever, cancer-related fever, deep vein thrombosis, pulmonary embolus, transfusion reaction, and dysautonomias.

HISTORY TAKING[12]:-

Important aspects of history[12] in a child with fever and neutropenia include :

- New site-specific symptoms of localized infection
- Underlying comorbid conditions (Diabetes or recent surgery)
- Recent documented infections or colonization
- Antimicrobial prophylaxis
- Infection exposures
- Intravascular catheters or other devices
- Concomitant noninfectious cause of fever
- Vaccination history
- Previous chemotherapy agents used and stage of chemotherapy
- Current medications including glucocorticoids and immunosuppressive agents for children with hematopoietic cell transplantation

PHYSICAL EXAMINATION[12]:-

Important aspects of physical examination[12] in a child with fever and neutropenia include:

- Abnormal vital signs- Wide pulse pressure may indicate septic shock, Tachycardia out of proportion to the degree of fever or tachycardia that persists despite defervescence may be a sign of early septic shock, even without hypotension.
- Respiratory signs and symptoms- Tachypnea, nasal flaring, retractions and de-saturation must be looked for.
- Skin- Assess for poor perfusion, slow capillary refill and signs of localized infection, central venous catheter exit sites and sites of bone marrow aspiration and lumbar puncture.
- Any site with purulent discharge
- Sinuses
- Oropharynx, including gums
- Lungs
- Abdomen
- Perineum, particularly the perianal and labial regions
- Altered mental status

ROUTINE LABORATORY AND IMAGING STUDIES[12,19]:

The basic laboratory evaluation for child with fever and neutropenia include:

- Complete Blood Count with differential and Platelet count
- Electrolytes, Creatinine, Blood urea nitrogen
- Liver transaminases and Total Bilirubin
- Blood cultures

Blood culture:- Blood culture should be obtained without delay in children with febrile neutropenia. Blood culture should be taken from each lumen of central catheter and also a peripheral blood culture.[10,51-55] Culturing blood from both peripheral and central sites helps to

distinguish true bacteremia from infection related to the catheter and to guide decision regarding catheter removal.[56,57] Peripheral cultures increase the identification of true bacteremia.

As the episodes of febrile neutropenia may prolong the hospital stay, increase health care expenses and compromise the efficacy of chemotherapy due to delays and dose reduction, therefore it is important to predict the risk factors at an early stage. An early prediction of risk factors may modify the outcome in several patients and help to improve the survival rates.

RISK STRATIFICATION: Risk stratification[51,52,58-61] is a recommended starting point for managing patients with fever and neutropenia.

High risk patients – those with anticipated prolonged (>7 days) and profound neutropenia (ANC≤100 cells/mm^3 following chemotherapy) and/or significant medical co-morbid conditions, including hypotension, pneumonia, new onset abdominal pain or neurologic changes- are candidates for intravenous empirical therapy.

Low risk patients – those with anticipated brief (≤7 days) and mild neutropenic periods and no or few co-morbidities- are candidates for oral empirical therapy.

Formal risk classification may be performed using the validated Multinational Association for Supportive Care in Cancer **(MASCC)** scoring system, which is available for adults. Various scoring systems are available for children, which are as under-

Predictive models for risk stratification in pediatric febrile neutropenia included in study[62]:

MODEL	OUTCOME PREDICTED	VARIABLES AND THEIR SCORING	RISK STRATIFICATION
1.Santolaya et al	Invasive bacterial infection	1.Relapsed leukemia 2. Chemotherapy within 7 days of episode 3. CRP≥90 mg/L 4.Hypotension 5. Platelets ≤50,000/ mm^3	High risk- 2 risk factors or CRP≥90 mg/l or hypotension or relapse of leukemia Low risk- No risk factors or platelet ≤ 50,000/mm^3
2. Ammann et al.	Severe bacterial infection	1.Bone marrow involvement by malignancy=7 2.Diagnosis other than pre-B-ALL=3 3.No clinical signs of viral infection=4 4.CRP level 6-50 mg/L=3, CRP>50 mg/ml=6 5.TLC 0.6-1.0X10^9=3, TLC≤0.5 X 10^9=6 6 .Central venous catheter present=2 7.Hb 7-10 mg/dl=2, ≤7 mg/dl=1	High risk:-Sum>4 Low risk:-Sum ≤ 4
3. Rondinelli et al.	Severe infectious complications	1.Central venous catheter present=2 2. Age >5 years=1 3. Clinical site of infection=4.5 4.No upper respiratory tract infection=2.5 5.Fever>38.5°C=1 6.Hb≤7 mg/dl=1	Low risk-2.5 to <5.5 Intermediate- ≥5.5 to 9.0 High risk- ≥9

4. SPOG adverse events rule	Adverse events	1.Chemotherapy more intensive than ALL maintenance = 4 2. Hb>9 mg/dl=5 3.TLC < 0.3 X 10^9 /l=3 4.Platelet<50,000=3	Low risk-<24 High risk-≥9
5. Hakim et al.	Proven bacterial infection or culture negative sepsis	1.Score from cancer diagnosis: AML=20, ALL/Lymphoma=7, Solid=0 2.Clinical presentation of serious unwell/toxic=14 3.Fever at presentation≥39°C=11 4.ANC <100/mm^3=10	Low risk-<24 High risk-≥24
6. Agyeman et al.	Bacteremia	1.Shaking chills ever observed 2.Hb>9 mg/dl 3.Platelet<50,000/mm^3 4. Any other need for inpatient care	Low risk-no risk factors High risk- any one
7.Anirban Das et al.	Complications	1.Undernutrition=2 2.Time from last chemotherapy ≤ 7 days = 2 3.Presence of focus of infection = 2 4.ANC ≤ 100/mm^3=2 5.CRP > 60 mg/ml= 5	Low risk-<7 High risk-≥7

Patients with febrile neutropenia need to be administered with broad spectrum antimicrobials within 60 minutes of time from presentation in the hospital. This time is referred to as the golden hour.[63] The reasons for delay could be patient related such as late arrival to the hospital due to non-availability of transport, ingestion of acetaminophen at home, inability to realise seriousness of situation, ignorance or unawareness of parents, waiting for another fever spike, poor iv access, monetary issues, or could be hospital related.[64]

It has been proven that prompt and systematic management of febrile neutropenia significantly decreases mortality in these children.[65,66] It has also been observed that length of hospital stay corelates positively with door to antibiotic interval.[67]

In cases with severe sepsis, each hour of delay in antibiotic administration over the ensuing 6 hours of onset of hypotension has been found to be associated with an average decrease in survival of 7.6%.[68] These survival rates can easily be improved by prompt and timely administration of empirical antibiotics.

The need of this study was to assess the clinical profile of children with febrile neutropenia, factors contributing to the poor prognosisand to identify the time to antibiotics and its effect on outcome.[15,69,70]

DOCUMENTED INFECTION:- For children with febrile neutropenia and documented infection at any point of time during treatment, antimicrobial therapy is modified according to culture and susceptibility results and site of infection.[12] Infection may be documented microbiologically (eg. Positive culture) or clinically (eg. Cellulitis or pneumonia without isolated micro-organism).

Clinical worsening or instability:- If there is a hemodynamic instability and an identified source of fever, antimicrobial therapy should be broadened to increase activity against gram-positive, gram-negative, resistant and anaerobic bacteria.[71-79] Appropriate antimicrobial therapy is achieved by changing Cefepime to Meropenem, adding Vancomycin and increasing gram-negative activity by adding an aminoglycoside, ciprofloxacin, or aztreonam. [80-88]

Clinically stable and improved:- Children who remain stable and are showing clinical improvement, antibiotic therapy is continued for 7 to 14 days as appropriate for infection and until ANC is > 500 cells/microL and increasing.

NO DOCUMENTED INFECTION:- For children with febrile neutropenia and no documented infection after 48 hours, antimicrobial needs to be changed as per clinical status of child.

Clinical worsening or instability:- If there is hemodynamic instability and no identified source of fever, antimicrobial therapy should be broadened to increase activity against gram-positive, gram-negative, resistant and anaerobic bacteria. [71-79]

Clinically stable and improved:- Children who remain stable and are showing clinical improvement, but with no documented infection, antibiotic therapy is continued for 7 to 14 days as appropriate for infection and until ANC is > 500 cells/microL and increasing.

Clinically stable, persistent fever < 96 hours- Children with febrile neutropenia who are clinically stable and remain febrile but have no documented infection, antimicrobials with additional gram-positive activity and/or additional gram-negative activity after 48 hours are discontinued (if added to initial regimen). [71-79]

Clinically stable, persistent fever for > 96 hours or recurrent fever-

Children with febrile neutropenia who are clinically stable with persistent fever for >96 hours despite broad-spectrum empirical antimicrobials, are continued with empirical antimicrobials and are daily evaluated for signs of Bone marrow recovery. [71-79] If the signs of bone marrow recovery are present, empirical antibiotics are continued. [80-88] But if there are no signs of bone marrow recovery, Anti-fungal therapy is added.

GI symptoms: Children with abdominal pain, perineal inflammation, bleeding per rectum, diarrhoea should be administered anaerobic coverage (Metronidazole) if not already receiving antibiotics active against anaerobes (Meropenem, Piperacillin-Tazobactam). [89] If infection with C.difficile is suspected, Metronidazole or oral Vancomycin is added. [90,91]

Addition of anti-fungal therapy:

Anti-fungals are added in children who have recurrent or persistent fever for > 96 hours after initiation of empiric broad-spectrum antimicrobial therapy, no identified source of fever, and ANC that is not increasing. [92]

The risk of invasive fungal infection is increased in children with [93-100] :-

- Acute Myeloid Leukemia
- Relapsed or high-risk Acute Lymphoblastic Leukemia
- Prolonged neutropenia (>10 days)
- Highly myelosuppressive chemotherapy
- High dose glucocorticoid therapy
- Allogenic hematopoietic cell transplant recipient
- Graft-versus-host-disease

Anti-fungal regimen [100-108]:-

- Amphotericin B (Liposomal Amphotericin, Amphotericin B complex, Amphotericin B colloidal dispersion)
- Echinocandins (Caspofungin, Micafungin, Anidulafungin)
- Triazole derivatives (Voriconazole, Posaconazole)

DURATION OF ANTIMICROBIAL THERAPY:

The total duration of empiric antimicrobial therapy depends upon clinical response and myeloid recovery. [109-111]

Antibacterial therapy- Antimicrobial therapy is generally continued until blood cultures have been negative for > 48 hours, if patient has been afebrile for >24 hours, and ANC is > 500 cells/micro L and increasing.

Antifungal therapy- Empiric antifungal therapy is continued until resolution of neutropenia in the absence of evidence of invasive fungal infection.

Our study would evaluate the clinical profile including incidence, demographic details of children with febrile neutropenia and identify the time to antibiotic administration, which would help to understand the factors affecting the outcome, so that effective strategies may be planned to improve the survival rate of these patients.

AIMS AND OBJECTIVES

- To study the clinical profile of children presenting with febrile neutropenia.
- To study the time to antibiotic administration in children with febrile neutropenia.

REVIEW OF LITERATURE

For patients with cancer, fever during neutropenia may be the only sign of infection because the inflammatory response that causes visible signs of infection (erythema, edema, swelling, or drainage) does not occur. [63]Pediatric oncology in developing countries has its unique share of problems, including undernutrition (30–70%), higher prevalence of a clinical focus of infection, and increased rates of complications and deaths.[60, 112-118]Many studies have evaluated door to antibiotic interval in children with febrile neutropenia to evaluate the factors responsible for delay and to develop strategies to decrease this time interval. Identifying this interval and factors responsible for delay would help institutions to develop strategies/policies to decrease the symptom to antibiotic interval in these patients.

Incidence, types& demographic features of childhood malignancies:

The incidence of childhood cancer in India ranges from 38 to 124 million children per year.[2,3,4] The incidence is higher in males as compared to females. The most common childhood cancer in India is Leukemia.[1] The overall 5 year survival rate is about 40% in India.[2,6]

A cross-sectional study was conducted by Farhana Badaret al.[119] to estimate the cancer incidence by age group for the Lahore district population, Pakistan in 2010–2012. Between 2010 and 2012, total of 15,840 new cancers were diagnosed, out of which 57% were in females. This study concluded that ASIR was lower in females than males. Leukaemia was the most common diagnosis in children and bone tumour in adolescents, regardless of gender.

A cross-sectional study was performed by Fatemeh Karimi et al.[120] in the Hematology-Oncology Center of Omid Hospital, Iran. A total of 115 oncology patients were admitted with FN, corresponding to a cumulative incidence of 1.26% of FN cases per 1000 oncology admissions.

A study conducted by KalpathiKrishnamani et al. [121] suggested that hematologic malignancies for 299 (89.7%) episodes. Acute myeloid leukemia (AML), acute lymphoblastic leukemia (ALL), acute promyelocytic leukemia, Ewing's sarcoma and Diffuse large B cell lymphoma accounted for 129 (38.3%), 117 (35.1%), 36 (10.8%), 14 (4%) and 7 (2%) patients respectively.

Similar results were seen in a study conducted by Anirban Das et al.[62] in which four hundred and fourteen episodes of FN in 264 children were included in the study. Median age was 5 years. Male:female ratio was 3:1. Majority were hematologic malignancies (367; 88.6%): acute lymphoblastic leukemia (307; 74.2%), acute myeloid leukemia (AML, 38; 9.2%), non-Hodgkin lymphoma (16; 3.8%), Hodgkin lymphoma (6; 1.4%), and solid tumors (47; 11.4%).

A recent study by Chaudhuri J et al [117] demonstrated a strong association between malnutrition (prevalence 62.4%; n = 48) and death (OR 7.29, 95% CI 0.84–63.34, P = 0.04) among children with hematologic malignancies admitted with FN.

Etiology & Clinical features of Febrile neutropenia:

Approximately, 50% of patients with FN will develop infection, of which 20% of patients with profound neutropenia will find documented bacteremia.[12]Infectious complications are an important cause of morbidity and mortality in pediatric cancer patients with FN. The rate of documented infection ranges between 10 and 40 % in febrile neutropenia patients.[21-26]Despite anappreciable reduction over the past few years in infection-related mortality in patients with cancers who present with FN, infections remain a major cause of morbidity and mortality in this vulnerable population.

A study was conducted by Hana Hakim et al[9] to study the etiology, clinical course and outcome of fever and neutropenia (FN) in children with cancer in the United States. Patients were managed as per FN guidelines of the institution and blood cultures were collected. Of 337 FN episodes, infection was proven in 86 (25%) and probable in 75 (22%). 177 episodes (53%) were labelled as fever of unknown origin

(FUO). Bacteremia accounted for most (41) of the proven bacterial episodes, with viridans streptococci (13), Pseudomonas spp (6) and E. coli (6) the most frequently isolated organisms. Viral pathogens were identified in 29 (34%) episodes.

In a study conducted by Coralie Raad et al,[122] it was found that Coagulase-negative staphylococci were identified in 49.7% BSI and Staphylococcus aureus caused 6.5% infections. Gram-negative bacilli accounted for 21.6% of isolated bacteria, Pseudomonas for 4.8%.

A study performed by Fatemeh Karimi et al.[113] in the Hematology-Oncology Center of Omid Hospital, Isfahan, Iran found that from all positive cultures, Gram-positive microorganisms were the most found pathogen.

The study conducted by Anirban Das et al.[62] found that the documented infections were bacterial in 65 (79.3%), invasive mycoses in 16 (19.5%), and both bacterial and invasive mycoses in 1 (1.2%) in their study.

A study conducted by ME Santolaya et al [51] found that IBI occurred with 140 (53%) of 263 episodes of febrile neutropenia that were diagnosed as bronchopneumonia, sepsis syndrome, UTI, bacteremia, catheter infection, typhlitis, and/or cellulitis. Of the 123 children without IBI, majority had either upper respiratory infection or fever of unknown origin diagnosed. For 140 episodes in children who were IBI positive, a total of 61 bacteria (44%) were recovered; the most common organisms recovered were E. coli, S. aureus, CONS, and Klebsiella species.

A study performed by Machado et al and Carratala J et al[123,124]suggested that Enterocolitis and pneumonia are associated with an inferior outcome in neutropenic patients.

A study conducted by Kimberly Davis et al [125] found that bacterial bloodstream infection is the most commonly diagnosed cause of febrile neutropenia, with Gram-positive organisms most frequently isolated. Gram-negative organisms are becoming more prevalent, with an increasing trend towards resistant organisms.

Significant association between a lower respiratory focus and bloodstream infections has been previously reported from a study done by Ahmed N et al[126] from Egypt.

In contrast, presence of an upper respiratory tract infection was associated with less chances of severe complications in a study done by Rondinelli et al from Brazil ($P < 0.001$).[60]

Ammann et al. [59]reported that the absence of clinical signs for viral infection was a risk factor for systemic bacterial infections.

Management of Febrile neutropenia:

Antibiotics are the mainstay treatment of febrile neutropenia. For children with FN who are clinically stable and in whom there is no suspicion of resistant infection, initial broad spectrum monotherapy with an antipseudomonal beta-lactam agent (eg. Cefepime, Meropenem, Piperacillin) is started. Combination therapy is usually reserved for children with hemodynamic instability or with localized infection or in patients having concern for growth of resistant organisms.

A cross-sectional study was performed by Fatemeh Karimi et al.[113]in the Hematology-Oncology Center of Omid Hospital, Isfahan, Iran. The most frequently administered antibiotic agents were meropenem (91.3%) and vancomycin (47.82%) alone or in combination. Empiric antifungal agents initiated in 20.86% of cases, and none of the patients needed antiviral treatment.

A study was conducted by Giampaolo Bucaneve et al.[127] in which it was concluded that the combination of piperacillin/tazobactam and tigecycline is safe, well tolerated, and more effective than piperacillin/tazobactam alone in febrile, high-risk, neutropenic hematologic patients with cancer.

In a study conducted by Hahn-Ast C et al and Maschmeyer G. et al. [128,129] it was postulated that early diagnosis of IFD and prompt implementation of aggressive antifungal treatment have proven to be critical for patient survival.

A study done by Maria E. Santolaya et al[95] concluded that Pre-emptive antifungal therapy was as effective as empirical antifungal therapy in children with cancer, fever and neutropenia, significantly reducing the use of antifungal drugs.

Need for Risk stratification in patients with febrile neutropenia:

Risk stratification of patients at the time of admission is necessary as many episodes of febrile neutropenia are uncomplicated and can be managed safely on outpatient basis without adding any undue burden on patients in the form of cost & expenditure and also reduces the burden on the health care system, especially in developing countries, where the number of patients exceed the resources. Therefore, a risk prediction model is necessary to stratify the patients as low-risk or high risk.

A study to find out such risk predictors for adverse outcome in pediatric febrile neutropenia was conducted by Prasad M et al. [130] In this study, 250 consecutive episodes of chemotherapy induced febrile neutropenia in 183 pediatric patients were analyzed and adverse outcomes were defined. They concluded that 5 factors found to independently predict adverse outcome were- Previously documented infection in the last 6 months (P-0.011), presence of significant focus of infection ($P < 0.001$), ANC < 100/mm^3 (P-0.016), peak temperature > 102.2°F in this episode of febrile neutropenia (P-0.007), fever persisting for more than 5 days during this episode of febrile neutropenia ($P < 0.001$).

Risk stratification of patients with febrile neutropenia into high risk and low risk of developing complications helps in making decision regarding optimal treatment i.e whether to treat with oral or intravenous antibiotic and whether to treat as inpatient or outpatient. As a universally approved & accepted predictive model for pediatric FN is lacking, a study aiming to substantiate a score predicting risk of complications in pediatric patients with febrile neutropenia was conducted by Anirban Das et al. [62]

Anirban Daset al. conducted a study on validation of risk stratification for children with febrile neutropenia in pediatric oncology unit in India. [62] A total of 414 episodes of FN in 264 children were included in the study. A risk based score based on undernutrition (2 points), time from last chemotherapy (<7 days- 2 points), presence of a non-upper respiratory focus of infection (2 points), CRP > 60 mg/l (5 points) and ANC < 100/mm^3 (2 points) was used to stratify patients into low risk (50.2%) and high risk (49.8%). Children with a score of 7 or higher demonstrated higher odds (OR 17.2, 95% CI 7.7–38.6) of developing complications and were classified as “high risk.” Score of less than 7 predicted lower risk of complications, and these children were classified as “low risk”. Hence this study concluded that a model for risk stratification predicts an outcome of clinical relevance.

A similar study was conducted by M.E. Santolayaet al.[51]on risk prediction model for invasive bacterial infection (IBI). This study was prospectively evaluated in263 episodes of febrile neutropenia in oncology children presenting with fever and neutropenia.[51] The study included assessment of 5 previously identified risk factors: C-reactive protein (CRP) > 90 mg/L, hypotension, relapse of leukemia, platelet count of <50,000 platelets/mm^3, and recent receipt of chemotherapy. Children were classified as having high or low risk for IBI according to a model that considered the number and type of variables present. Of the 263 episodes of fever evaluated during the 17-month study, 140 (53%) were in IBI-positive children. Identification of these five risk factors during the initial 24 hours of hospitalization was found to be useful in discriminating between children with a high or low risk for IBI.

A cross-sectional study was performed by Fatemeh Karimi et al.[113] in the Hematology-Oncology Center of Omid Hospital, Isfahan, Iran. Among them, female sex (42.6%) and lymphopenia (26.5%) were the most noted predictors. Neutropenia (81.7%) was the most reported risk factors for serious complications.

A study conducted by Rondinelliet al.[60] included risk stratification on the basis of 6 parameters which were presence of central venous catheter, age more than 5 years, clinical site of infection, no upper respiratory tract infection, Fever > 38.5 degree Celsius and Hb < 7 mg/dl.

Hakim et al[9] conducted a study and included 4 parameters for risk stratification, which included type of cancer, clinical presentation of serious unwell/toxic, fever at presentation and ANC <100/mm^3.

Importance of prompt administration of antibiotics in Febrile neutropenia:

Febrile neutropenia (FN) is considered as an oncological emergency, which needs to be treated within an hour. As per the recent guidelines on febrile neutropenia by the Infectious Diseases Society of America, any patient with febrile neutropenia should be injected with empirical antibiotic therapy within 2 hours of presentation to hospital. These recommendations are in accordance with studies suggesting that systematic time bound management of a febrile neutropenic or a septic patient significantly decreases mortality. It has also been found that length of hospital stay correlates positively with door to antibiotic intervali.e more the time taken to administer antibiotic, more shall be the length of hospital stay. It has also been found that prompt administration of antibiotics improves the survival rates in these patients.

A study of this kind was conducted by Namrata Todurkar et al.[131]at Pediatric Hematology Oncology Unit in Department of Pediatrics, Postgraduate Institute of Medical Education & Research, Chandigarh, which studied the time to antibiotic administration in children with febrile neutropenia.[131]A total of 211 children (mean age: 6 yr) with FN were evaluated. The objective of the study was to find the proportion of children with febrile neutropenia who had time to antibiotic administration (TTA) of ≤60 min and evaluate causes for delay. The time from assessment at triage to the time of administration of the first

dose of antibiotic was evaluated as TTA. Waiting for blood test results (30%), delay in preparation of antibiotics (21%) and delay in allotment of bed (30%) were significant causes for delay. Secondary outcome included the length of hospital stay, transfer to pediatric intensive care unit (PICU) within 24 h of admission and death in that particular hospital admission. The mean duration of hospital stay in children with a TTA ≤60 min was 7.7 days compared to 6.6 days in participants whose TTA was >60 min (P=0.36). Logistics for admission and awaiting blood counts were chief causes for delay.

Factors leading to delay in administration of antibiotics:

In a developing country, patients are often unable to reach hospital immediately. The various causes for delay in antibiotic administration are divided into:-

(i) Physician-level causes

(ii) Nursing-level causes and

(iii) Logistical issues

Physician level delay could be due to decision not to give antibiotics,informed but busy with another patient, waiting for blood results,unaware of the need to administer antibiotics, decision delay for IV/PO antibiotics, difficult IV cannulation.

Nursing level delay could be due to not informed about patient, delay in preparing antibiotics, busy with other work, no IV access.

Logistical level delay could be due to time to get file made/allotment of bed, delay in procurement of antibiotics, non-availability of blood culture set, time in radiology in getting X-ray/ultrasound done, etc.

One such similar study was done by Sapna Oberoi et al. on Symptom to door interval in febrile neutropeniato determine the symptom to door interval in febrile neutropenic children with malignancies and to identify factors resulting in delay.[64]A total of 320 episodes of FN were studied. Symptom to door interval was measured as the time taken from onset of fever to the time of showing up in the hospital. The time between onset of fever and initiation of travel was based on recall of parents

when they were interrogated at the hospital. SDI during induction phase (median-8 hours) was less as compared to maintenance phase (median-36 hours). This study also found that patients during induction phase of therapy reach early to the hospital, while those in maintenance phase of chemotherapy arrive late. Ingestion of acetaminophen at home (30%), inability to realize seriousness of situation (27%), ignorance or unawareness of parents (9%) and non-availability of transportation services (12%) were the most common causes for delay and concluded that there was a considerable time lag seen between onset of symptoms and reaching hospital.

Complications in patients with febrile neutropenia and relation of delayed administration of antibiotic in worsening of complications:

Mortality due to sepsis is 1.6 times higher for pediatric patients with malignancy than it is for other children, as patients with neutropenia are particularly susceptible to serious bacterial infections and their complications.These complications include hypotension worsening to septic shock, respiratory distress worsening to respiratory failure, thrombocytopenia leading to bleeding, neutropenia leading to predisposition to over-whelming infections such as mucositis, peri-anal abscess, pneumonia, urinary tract infection, diarrhoea, neutropenic enterocolitis, meningitis, etc. It has been found that every single hour of delay after initial 6 hours of onset of hypotension has been associated with reduced survival rates.[68]

A study was conducted, keeping in view that identification of children with malignancy who are at risk for death during a febrile neutropenic (FN) episode may increase their possibility for survival, if identified early.

Maria E. Santolaya et al. [132]conducted this study on admission clinical and laboratory factors associated with death in children with cancer during a febrile neutropenic episode. [117]The aim of this study was to identify at the time of admission, clinical and laboratory variables which

differed significantly among children who survived or died during an episode of FN. Children who expired were admitted with lower ANC (P < 0.001) and absolute monocytes count levels (P = 0.008), higher blood urinary nitrogen (P = 0.03) and C-reactive protein values (P < 0.001), and had more positive cultures (79% versus 32%, P = 0.008). In this prospective, multicenter study, children admitted with a high-risk FN episode were uniformly assessed at admission and managed as per fixed protocol. Routine assessment of these variables may turn out to be useful in the early identification of children with a high-risk FN episode at risk for death.

A study was conducted by Jiun-Jen Lynn et al[133] on serious complications during hospitalization of febrile neutropenia. Complications were defined as unstable hemodynamic status, respiratory distress, altered mental status, newly developed arrhythmia that required intervention, and death during hospitalization. Among a total of 81 febrile neutropenic episodes in 78 patients, 25 (30.8%) episodes of serious complications were identified. Latency of the first dose of antibiotics, pneumonia and platelet counts≤50,000/mm3 were identified as independent factors associated with serious complications of febrile neutropenia. Earlier administration of antibiotics is associated with fewer complications in patients presenting to the ED with febrile neutropenia.

A study conducted by TugbaCetintepe et al [134]concluded that mortality was significantly associated with higher sequential organ failure assessment score (SOFA), quick sequential organ failure assessment score (qSOFA), and hematological SOFA (SOFAhem) scores on admission. All cases having SOFA score 10 and above and qSOFA score 2 and above died.

A study conducted by Anirban Das et al.[62] found that the outcomes included microbiologically detected infection in 19.8%, complications (respiratory failure, shock, encephalopathy, admission to ICU,

metabolic complications, congestive cardiac failure, neutropenic enterocolitis, coagulopathy and bleeding) in 26.3% and mortality in 10.4%. Complications were seen in 109 (26.3%) of 414 episodes of febrile neutropenia over 15 months. Fluid refractory shock and respiratory failure were the most common complications, present in 50 episodes each.

Effect of Quality improvement initiative in reducing time to antibiotic administration and improving outcome of patients with febrile neutropenia:

TTA is an accepted QOC measure with< 60 min being accepted as an appropriate TTA guideline. There has been an increasing evidence that meeting this guideline is associated with improved outcomes in patients with febrile neutropenia. Therefore QI (Quality Improvement) efforts aimed at reducing TTA become particularly important. QI measures can be applied to overcome all the perceived barriers or hindrances to minimize TTA and improve the outcome. These QI measures can be taken at the patient level by increasing awareness about the seriousness of situation or at the hospital level by formulating fixed protocols and treating FN as an emergency and treating these patients on a priority basis.

Jennifer L. Salstrom et al conducted a study on pediatric patients who received antibiotics for Febrile Neutropenia in less than 60 min and found that they have decreased Intensive care needs.[135] A quality improvement (QI) initiative that sought to decrease TTA and assess associated clinical outcomes in pediatric oncology patients was implemented. Analysis revealed several potential barriers to TTA <60 min and the most important were (i) waiting for the ANC; (ii) transferring the patient from an exam room to the infusion center; and (iii) finding a provider to write the antibiotic orders. The first PDSA cycle was the Sign & Hold PDSA which involved having a provider who wrote antibiotic orders for any patient presenting with fever prior to knowing the ANC. The goal of the Add-on Fever PDSA was to decrease the

time required to move a patient from an exam room to the infusion center by appointing someone who would define patients with potential FN. The CBC Sepsis PDSA focussed to reduce time spent waiting for an ANC result and required collaboration with laboratory staff. To address the Check-in to Specimen Received sub-process, the Designated Room PDSA was implemented. The analysis revealed a statistically significant 20% decrease in the need for ICU care and also the rate of mortality, when TTA is <60 min.

A study done by Corey et al [63] on Door/fever-to-patient antibiotic delivery was evaluated as a quality control measure in a new children's hospital. Initially, door/fever-to-patient time was significantly delayed. Collaboration between pharmacy, hospital bed control, medical, and nursing staff resulted in many changes in practice by all groups. As a result, the goal for prompt antibiotic delivery of thirty minutes or less was attainable after the intervention.

Prompt administration of antibiotics is associated with better outcome:

Febrile neutropenia (FN) is a major source of morbidity and mortality among pediatric oncology patients with cancer. The prompt administration of empiric parenteral antibiotics is the mainstay in the initial treatment of FN. Justification for the prompt administration of antibiotics includes the possibility for rapid progression of infection and the inability to differentiate those with and without serious infection at the time of initial analysis. Decreased TTA is associated with improved outcome of pediatric patients with FN in the form of reduced requirement of oxygen/ventilation/inotropes/blood products and overall reduced length of hospital stay.

A study conducted by Matthew Fletcher et al. [136]concluded that prompt administration of antibiotics is associated with improved outcomes in Febrile Neutropenia in children with cancer. [118]They conducted a single-center, retrospective cohort study of 1,628 FN

admissions from 653 patients from year 2001 to 2009. Outcome variables studied included: (1) an adverse event (AE) comprising mortality in hospital, pediatric intensive care unit (PICU) admission within 24 hours of presentation, and/or fluid resuscitation >40 ml/kg within 24 hours of presentation and (2) length of stay (LOS). The composite AE outcome was seen in 11.1% of admissions including 0.7% mortalities in hospital, 4.7% PICU admission, and 10.1% fluid resuscitation. Of the patients who expired or required admission to PICU, 91% had fluid resuscitation >40 ml/kg. Hence it was concluded that TTA and presentation to the ED were independently associated with poor outcomes of FN.

A study conducted by Corey et al [63] found that throughout the 20 months of monitoring and ensuring TTA<30 minutes, neither any patients were transferred or admitted to the pediatric intensive care unit due to septic shock, nor adverse effects or patient deaths were reported as a result of bacteremia.

MATERIALS AND METHODS

This was a prospective observational study which was conducted over a period of fifteen months (1st March 2021 to 31st May 2022) in Department of Pediatrics, Dayanand Medical College and Hospital, Ludhiana. The study included 3 sets of patients:-

1. All the patients who have an underlying malignancy and have developed febrile neutropenia as a result, were taken as participants.
2. This study was conducted after taking approval from the Institutional Ethics committee.

RISK STRATIFICATION: Risk stratification is a recommended starting point for managing patients with fever and neutropenia.

High risk patients – those with anticipated prolonged (>7 days) and profound neutropenia (ANC≤100 cells/mm^3 following chemotherapy) and/or significant medical co-morbid conditions, including hypotension, pneumonia, new onset abdominal pain or neurologic changes- were candidates for intravenous empirical therapy.

Low risk patients – those with anticipated brief (≤7 days) and mild neutropenic periods and no or few co-morbidities- were candidates for oral empirical therapy.

Anirban Das et al.(PGIMER) RISK MODEL*:

1. Undernutrition=2
2. Time from last chemotherapy ≤ 7 days = 2
3. Presence of focus of infection = 2
4. ANC ≤ 100/mm^3=2
5. CRP > 60 mg/ml = 5

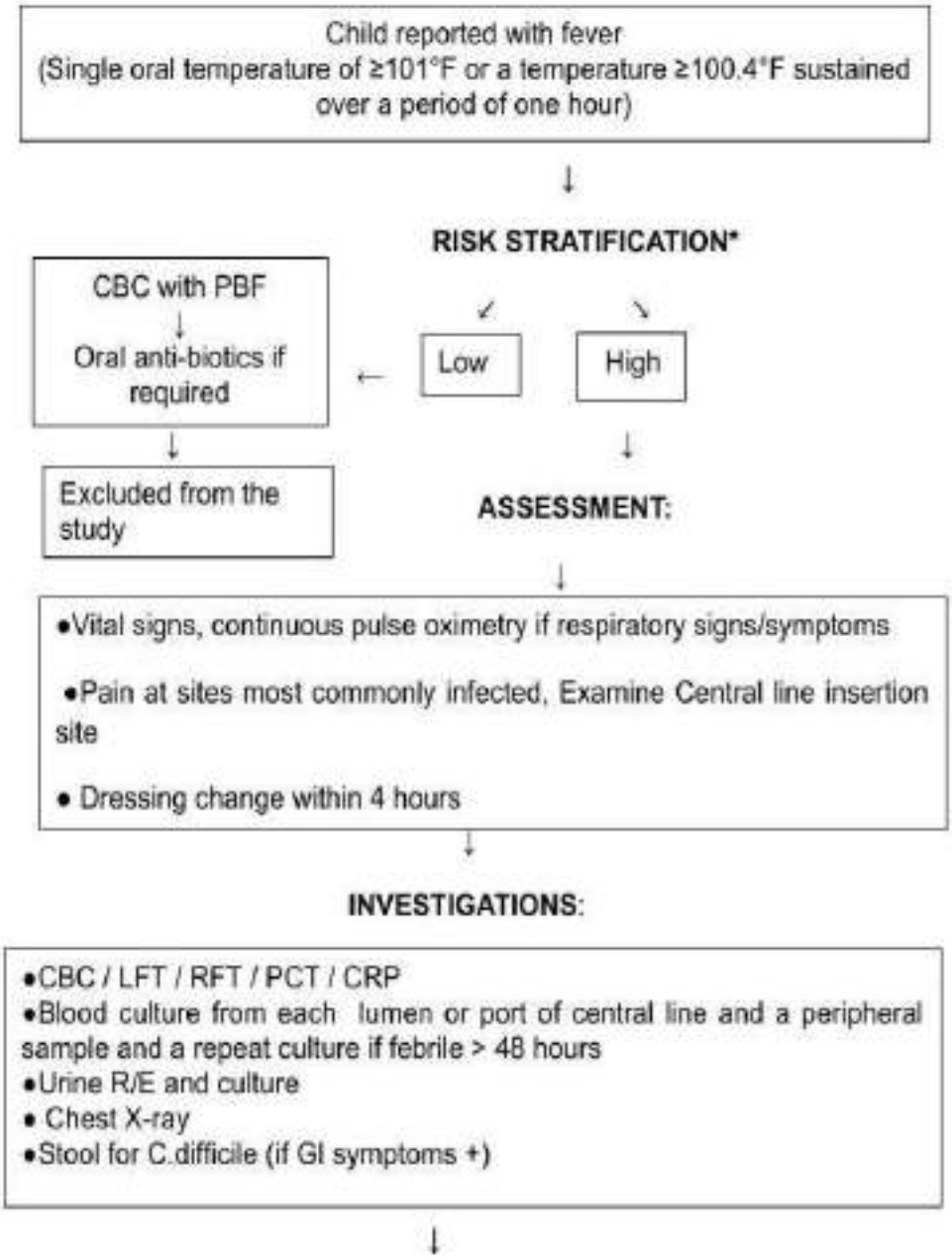
[Risk Stratification-Low risk-<7, High risk- ≥7]

During the study period (from 1st March 2021 to 31st May 2022), a total of 2010 patients were admitted in Paediatric Oncology Unit. Amongst these, 1284 patients were admitted for administration of chemotherapy, 312 patients were admitted for transfusion of blood products and 414 patients were admitted with fever. Ninety-six (96) episodes of FN in 71

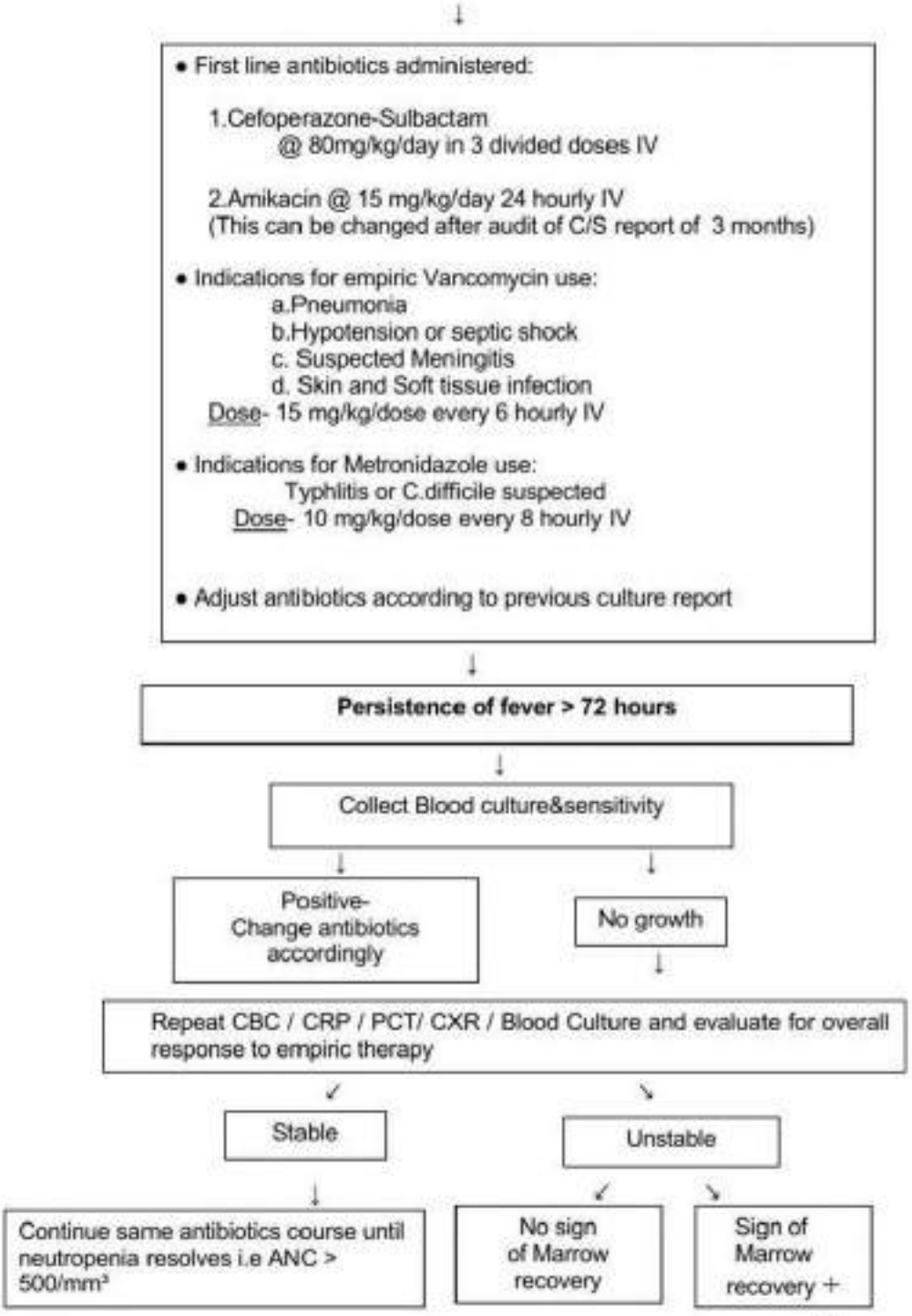
patients were categorized as high risk (as per the above risk stratification model). The remaining low risk patients were excluded from the study.

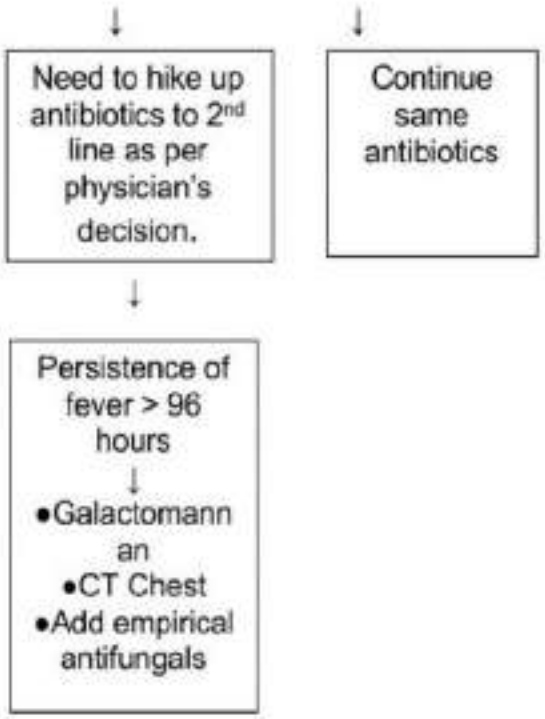
Demographic details, clinical features, vitals and investigations of all these episodes were evaluated at admission and followed during the hospital stay. Time to receive 1st shot of antibiotic after the onset of fever was recorded and cause of delay was evaluated. Time to defervescence of fever, requirement of hiking up of antibiotics, requirement of anti-fungals, requirement of oxygen, requirement of ventilation, requirement of inotropes, requirement of PICU, requirement of blood products, duration of antibiotics, duration of inotropes and duration of hospital stay was recorded in all the episodes and its relation with delay in receiving antibiotics was co-related.

MANAGEMENT ALGORITHM FOR FEBRILE NEUTROPENIA :


Child reported with fever
(Single oral temperature of ≥101°F or a temperature ≥100.4°F sustained over a period of one hour)
RISK STRATIFICATION*
CBC with PBF
Oral anti-biotics if required
Low
High
Excluded from the study
ASSESSMENT:
•Vital signs, continuous pulse oximetry if respiratory signs/symptoms
•Pain at sites most commonly infected, Examine Central line insertion site
• Dressing change within 4 hours
INVESTIGATIONS:
•CBC / LFT / RFT / PCT / CRP
•Blood culture from each lumen or port of central line and a peripheral sample and a repeat culture if febrile > 48 hours
•Urine R/E and culture
• Chest X-ray
•Stool for C.difficile (if GI symptoms +)

ANTIBIOTICS


• First line antibiotics administered:
1.Cefoperazone-Sulbactam
@ 80mg/kg/day in 3 divided doses IV
2.Amikacin @ 15 mg/kg/day 24 hourly IV
(This can be changed after audit of C/S report of 3 months)
• Indications for empiric Vancomycin use:
a.Pneumonia
b.Hypotension or septic shock
c. Suspected Meningitis
d. Skin and Soft tissue infection
Dose- 15 mg/kg/dose every 6 hourly IV
• Indications for Metronidazole use:
Typhlitis or C.difficile suspected
Dose- 10 mg/kg/dose every 8 hourly IV
• Adjust antibiotics according to previous culture report
Persistence of fever > 72 hours
Collect Blood culture&sensitivity
Positive-
Change antibiotics
accordingly
No growth
Repeat CBC / CRP / PCT/ CXR / Blood Culture and evaluate for overall response to empiric therapy
Stable
Unstable
Continue same antibiotics course until neutropenia resolves i.e ANC > 500/mm³
No sign of Marrow recovery
Sign of Marrow recovery +


Need to hike up antibiotics to 2nd line as per physician's decision.
Continue same antibiotics
Persistence of fever > 96 hours
•Galactomann an
•CT Chest
•Add empirical antifungals

•CBC would be repeated every alternate day to look for signs of marrow recovery.

Source of Data

Patients between 1 month and 18 years of age, diagnosed with malignancy and admitted in Pediatric Haemato-oncology ward in Department of Pediatrics, Ludhiana.

METHOD OF COLLECTION OF DATA

Data was collected from consenting patients meeting inclusion criteria after briefing them about the purpose of study.

The proforma consisted of demographic details of the participants and information related to primary diagnosis and ongoing treatment. A structured proforma based on objectives of study was designed to assess the time to first antibiotics.

Patients with suspected febrile neutropenia were managed according to a pre-designed algorithm (attached). The study investigator

monitored each patient. A record register was maintained by the staff, mentioning the temperature of child at arrival, time of arrival and time of administration of first antibiotics and was counter checked by the resident on duty. Time of arrival to Pediatric Haemato-oncology unit was taken as the zero hour and the time of first onset of fever was depicted in ”–ve” hours

INCLUSION CRITERIA:

1.Patients between 1 months-18 years of age, diagnosed with malignancy.

2.Single oral temperature of ≥101°F or a temperature ≥100.4°F sustained over one hour period with neutropenia i.e ANC < 500/mm^3 or a predicted decrease to <500/mm^3 over the next 48 hours. Patients were divided into two groups: Delay v/s non-delay on the basis of time of receiving antibiotics. Those who received antibiotics within one hour of onset of fever were categorized as Non-Delay group whereas those who received antibiotics after one hour of onset of fever were categorized as Delay group. All the demographic features, clinical presentation, vitals, investigations, hospital course and outcome were compared between these two groups.

EXCLUSION CRITERIA:

1. Patients > 18 years of age
2. Refusal to give consent
3. Neutropenia in patients other than malignancies.
4. Low risk febrile neutropenia being managed on oral antibiotics.

OUTCOME

To study the effect of ‘time to antibiotic administration” in children with febrile neutropenia on clinical outcome.The average time to antibiotics was studied in all the patients and the effect of delay in receiving antibiotics was studied in terms of time to defervescence of fever, requirement of oxygen, requirement of ventilation, requirement of inotropes, requirement of PICU, requirement of blood products,

duration of antibiotics, duration of hospital stay, duration of inotropes, recovery within 1 week, recovery after 1 week and mortality.

STATISTICAL ANALYSIS

Data were described in terms of range; mean ±standard deviation (± SD), median, frequencies (number of cases) and relative frequencies (percentages) as appropriate. To determine whether the data were normally distributed, a Kolmogorov-Smirnov test was used. Comparison of quantitative variables between the study groups was done using ANOVA and Mann Whitney U test for non-parametric data. For comparing categorical data, Chi square ($\chi 2$) test was performed and fisher exact test was used when the expected frequency is less than 5. A probability value (p value)less than 0.05 was considered statistically significant. All statistical calculations were done using (Statistical Package for the Social Science)SPSS 21version (SPSS Inc., Chicago, IL, USA)statistical program for Microsoft Windows.

OBSERVATION AND RESULTS

During the study period (from 1st March 2021 to 31st May 2022), a total of 2010 patients were admitted in Pediatric Oncology Unit. Amongst these, 1284 patients were admitted for administration of chemotherapy, 312 patients were admitted for transfusion of blood products and 414 patients were admitted with fever. Ninety-six (96) episodes of FN in 71 patients were categorized as high risk. The remaining low risk patients were excluded from the study.

DEMOGRAPHIC DETAILS:

AGE GROUP:

The mean age of 71 patients was 7.62 ± 4.88 years. Out of total 71 patients admitted with FN, twenty-seven (27, 38.0%) patients were in the age group of < 5 years; twenty-three (23, 32.4%) patients were in the age group of 5-10 years and twenty-one (21, 29.6%) patients were in the age group of >10 years.

Table 1: Mean age of patients

	N	Minimum	Maximum	Mean	Std. Deviation
Age (Years)	71	1.00	17.00	7.62	4.880

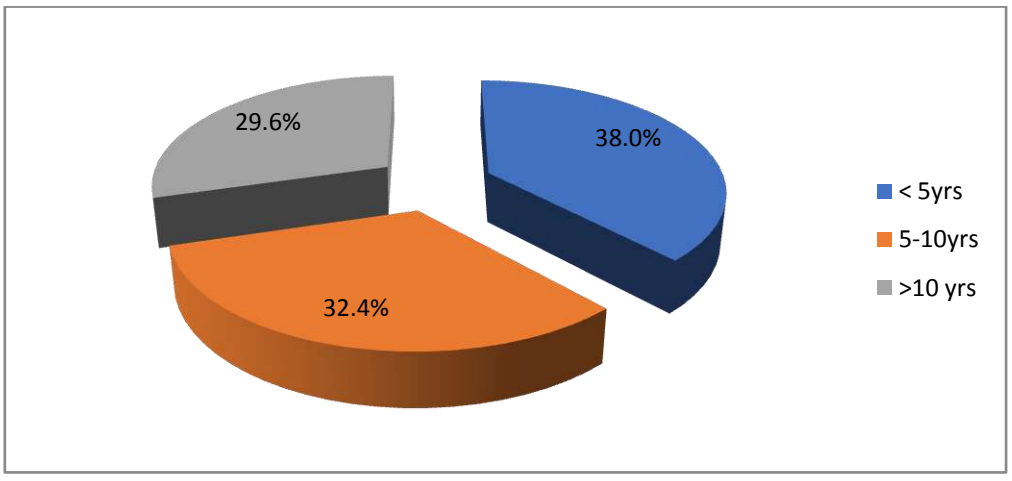


Figure 1: Distribution of age group

GENDER:

The male: female ratio was 3.17:1. In our study, there were 17 (23.9%) females and 54 (76.1%) males.

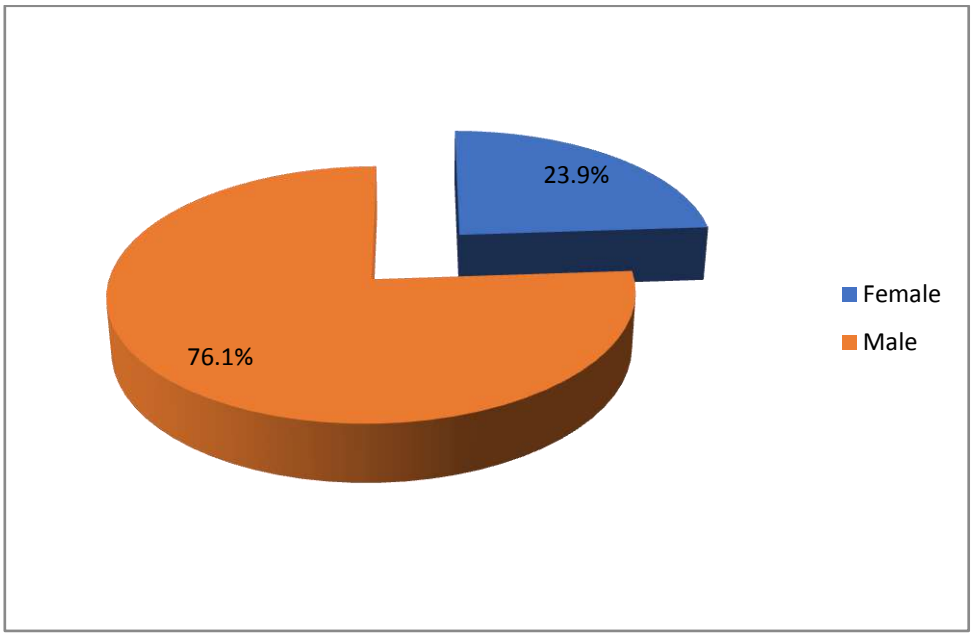


Figure 2: Distribution of gender

ANTHROPOMETRY:

Malnutrition was present in 15.5% patients and 11.3% patients were over-nourished.

Most of the children fell between 3^{rd}-97^{th} centile of weight, height and BMI.

Table 2: Distribution of Weight

Weight centile	No. of cases	Percentage
$<3^{rd}$	8	11.3%
3rd-97^{th}	60	84.5%
$>97^{th}$	3	4.2%
Total	71	100.0%

Table 3: Distribution of Height

Height centile	No. of cases	Percentage
$<3^{rd}$	5	7.0%
3rd-97^{th}	62	87.3%
$>97^{th}$	4	5.6%
Total	71	100.0%

Table 4: Distribution of BMI

BMI centile	No. of cases	Percentage
$<3^{rd}$	10	28.6%
3rd-97^{th}	19	54.3%
$>97^{th}$	6	17.1%
Total	35	100.0%

Table 5: Distribution of grades of nutrition

Grade of nutrition	No. of cases	Percentage
Normal	52	73.2%
Obese	1	1.4%
Over-weight	7	9.9%
Under-weight	11	15.5%
Total	71	100.0%

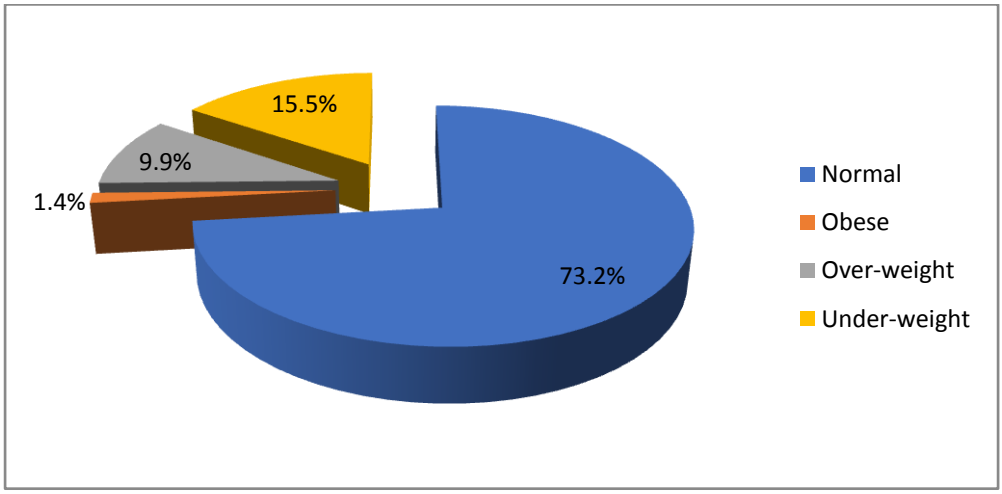


Figure 3: Distribution of grades of nutrition

DIAGNOSIS, RISK STRATIFICATION & TREATMENT:

The commonest malignancy in patients admitted with high risk FN was ALL (52, 59.38%) followed by AML (11, 11.5%) and Ewing's sarcoma (10.4%). Amongst FN episodes with ALL, 42.7% were stratified as Standard risk; 25% as Intermediate risk and 32.3% as High risk. Seventy-seven (77, 80.2%) were in Intensive phase of chemotherapy and nineteen (19, 19.8%) were in maintenance phase of chemotherapy. Chemotherapy had been administered within 7 days prior to onset of fever in 59.4% (n=57) patients and 40.6% (n=39) had received > 7 days prior to onset of fever. Fever was documented at home in 77 (80.2%)episodes [outpatient] and in the hospital in 19 (19.8%) [inpatients]. Six episodes (6, 6.3%) developed new onset fever within 72 hours of discharge from hospital.

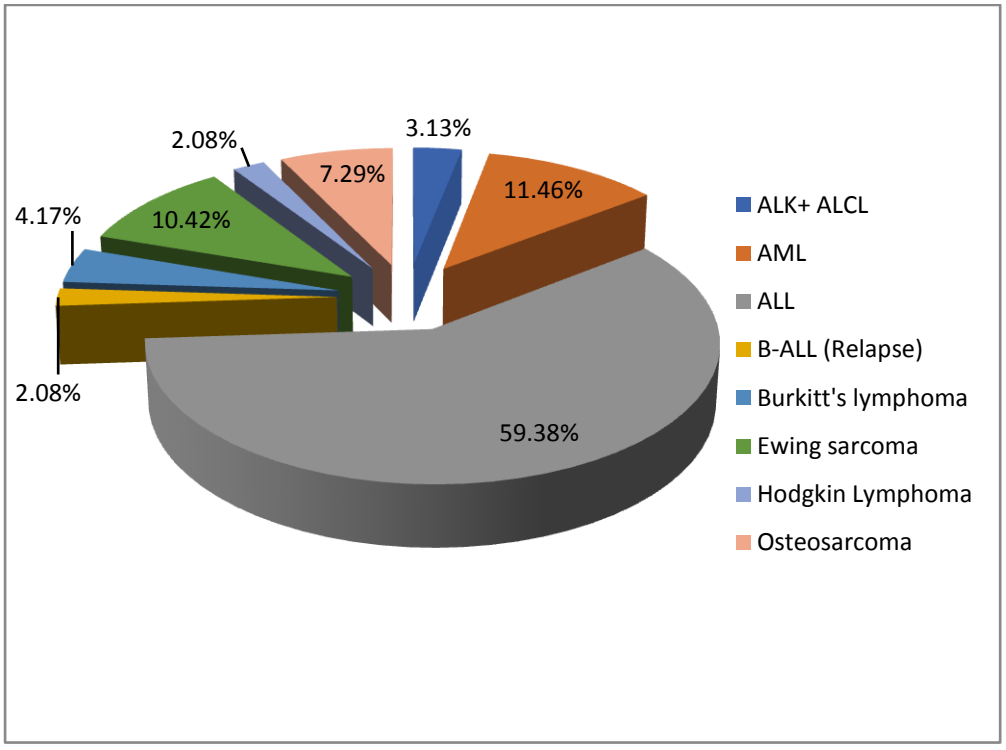


Figure 4: Distribution of diagnosis

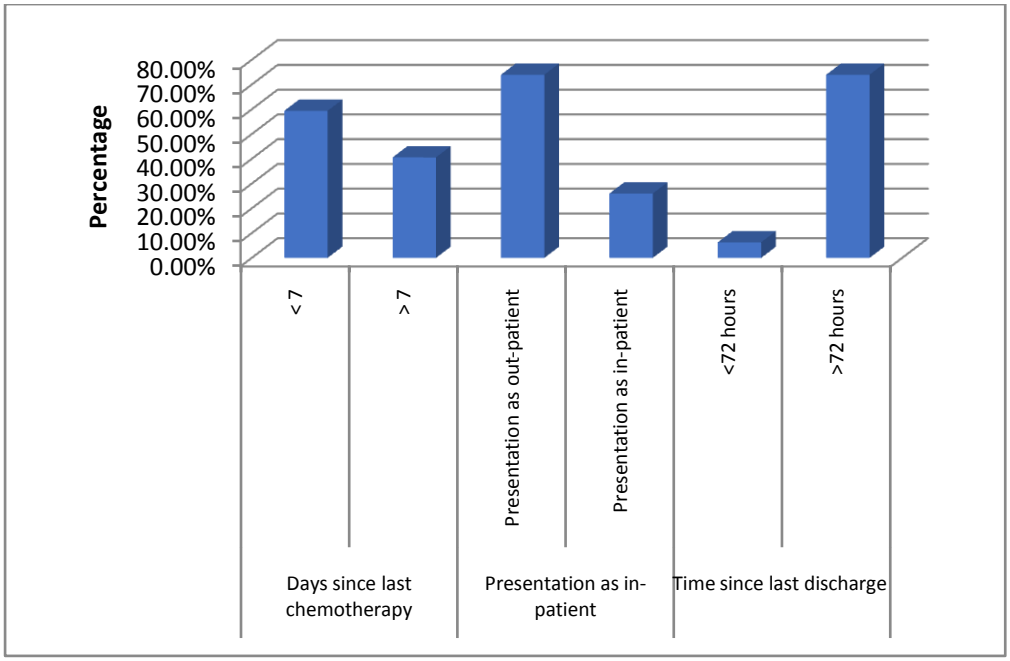


Figure 5: Distribution of number of patients as per days since last chemotherapy, presentation and time since last discharge

PICC LINE IN-SITU:

Out of total 96 FN episodes, three-fourth (72, 75%) had PICC line in-situ.

CLINICAL FEATURES:

At the time of admission, all patients were evaluated for focus of infection. The commonest site of infection (as per system involved) was Gastro-intestinal system followed by Respiratory system.

Table 6: Distribution as per system involved

	Total	Percentage
GIT symptoms	43	44.8%
Respiratory symptoms	20	20.80%
Urinary complaints	3	3.10%
CNS symptoms	1	1.00%
Musculo-skeletal symptoms	7	7.30%
Total	96	100.00%

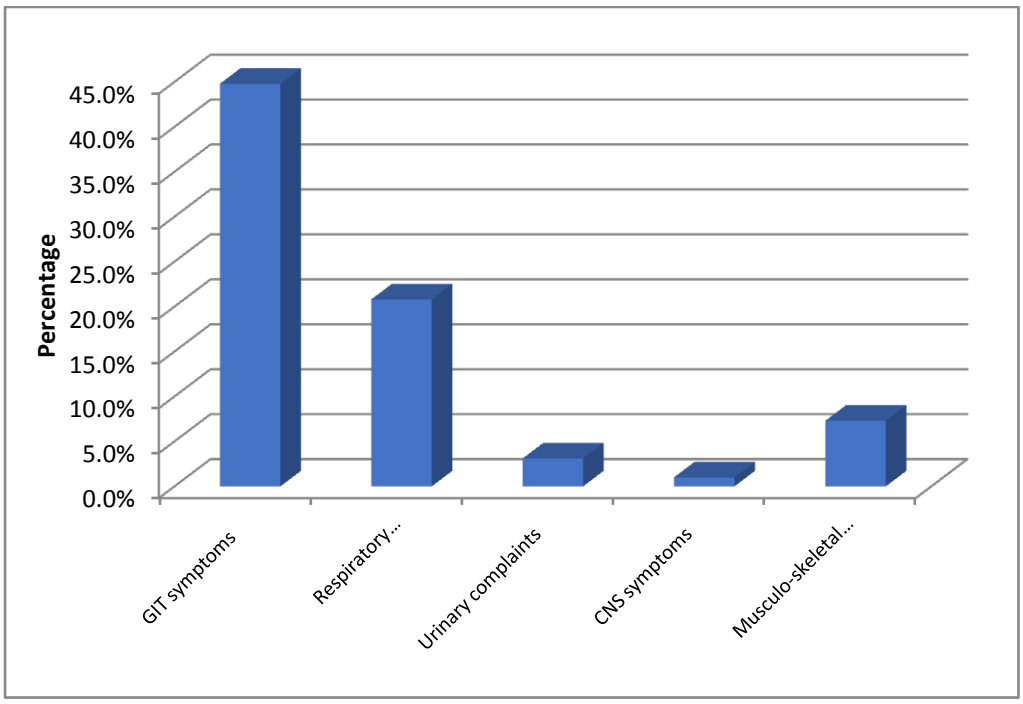


Figure 6: Distribution as per system involved

GIT SYMPTOMS:

GI symptoms were present in nearly half of the FNepisodes (43, 44.8%), predominant being diarrhoea seen in 20.8% patients followed by pain abdomen in 15.6%.

Mucositis:

Nearly a quarter of FN episodes(25, 26%) had mucositis at admission and the grade of mucositis was 1, 2, 3 in 4.2%, 16.7% and 5.2% patients respectively.

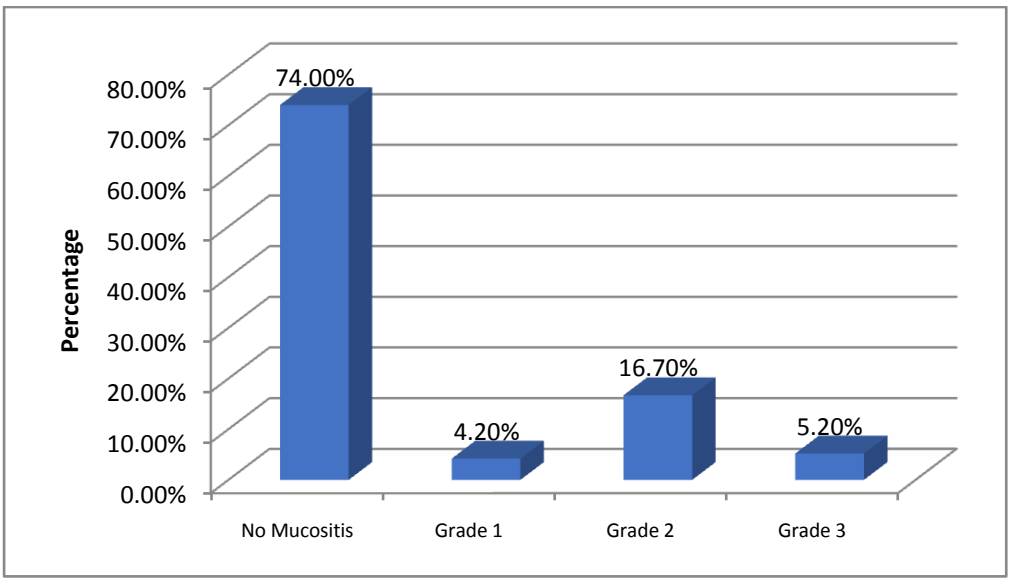


Figure 7: Grades of mucositis

Peri-anal Involvement:

At the time of admission, peri-anal examination was done in all patients, which revealed peri-anal involvement in the form of pain/fissure/abscess in 3 (3.1%) episodes.

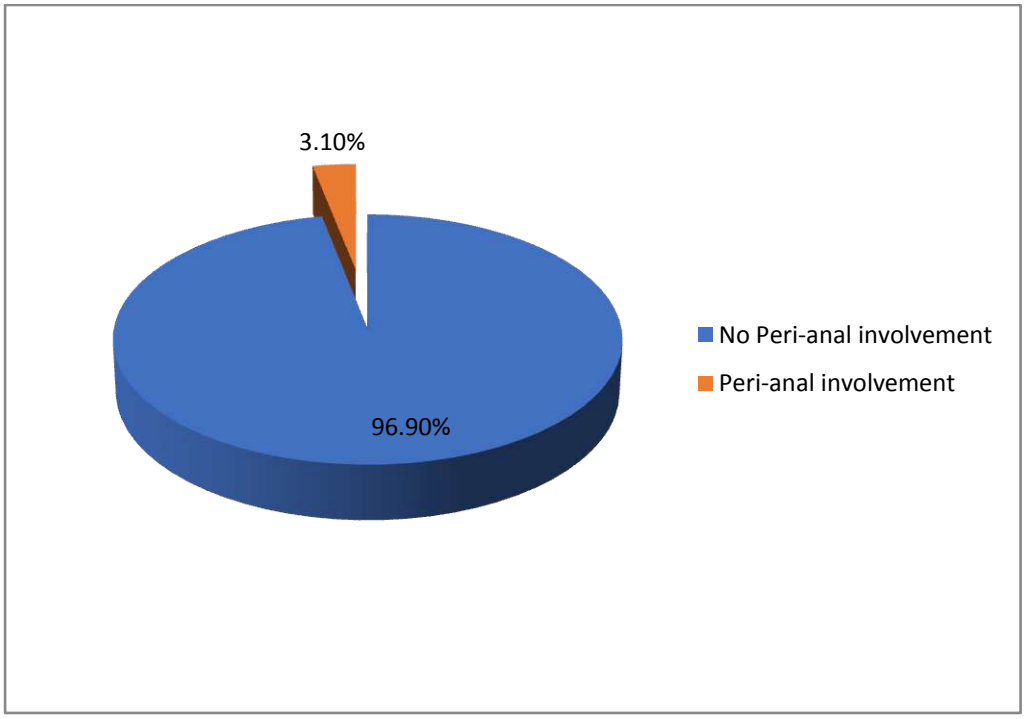


Figure 8: Distribution of Peri-anal involvement

RESPIRATORY SYMPTOMS:

About one-fifth of episodes (20, 20.8%) had respiratory symptoms, predominant being cough in 16.7% patients followed by respiratory distress in 7.3% episodes.

URINARY COMPLAINTS:

Only 3 (3.1%) episodes had urinary complaints, in the form of frequency & burning micturition in 2.1% followed by oliguria in 1%.

CNS SYMPTOMS:

Only 1 (1%) episodehad seizure during hospital stay.

MUSCULO-SKELETAL SYMPTOMS:

7 (7.3%) had Musculo-skeletal symptoms were seen in 7 (7.3%) patients in the form of myalgias.

OTHER SYMPTOMS:

Amongst other symptoms, 1 (1%) had herpes labialis, 1 (1%) had eye discharge and 1 (1%) had pain left eye.

Table 7: Distribution as per symptoms

	Total	Percentage
Pain abdomen	15	15.60%
Diarrhoea	20	20.80%
Cough	16	16.70%
Respiratory distress	7	7.30%
UTI	2	2.10%
Oliguria/anuria	1	1.00%
Breathlessness	1	1.00%
Seizures during hospital stay	1	1.00%
Myalgias	7	7.30%
Total	96	100.00%

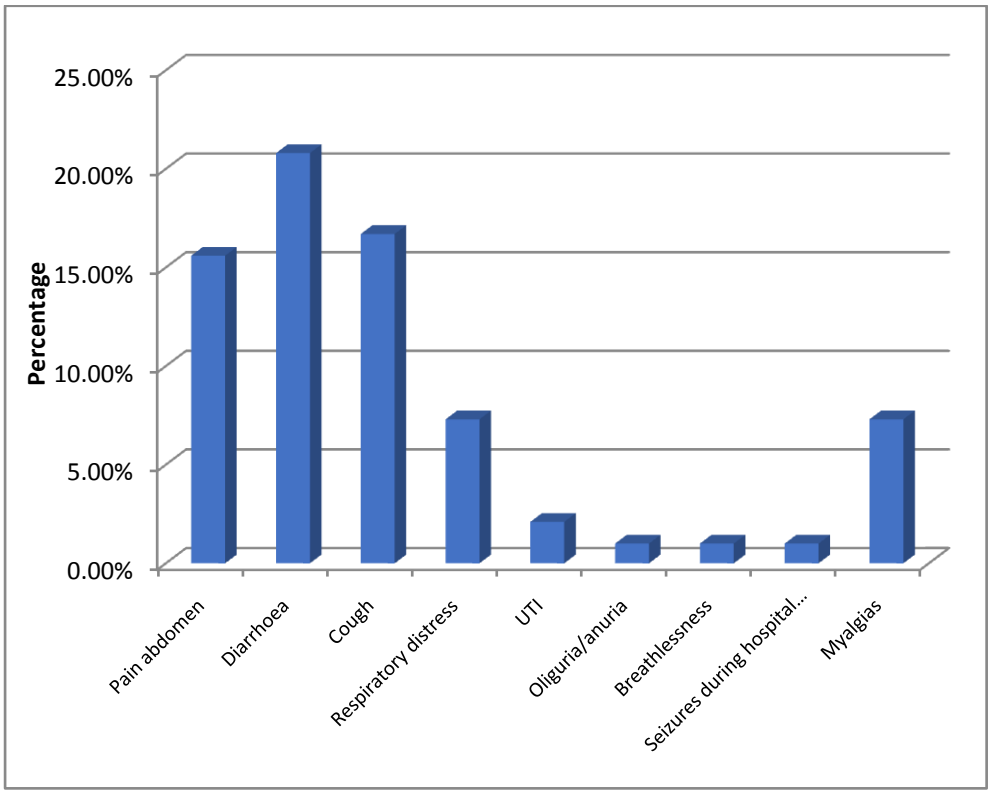


Figure 9: Distribution as per symptoms

SYMPTOMS AT PRESENTATION:

Table 8: Distribution as per symptoms at presentation

	Total	Percentage
Pain abdomen at presentation	13	13.50%
Bloody diarrhoea at presentation	1	1.00%
Non bloody diarrhoea at presentation	12	12.50%
Cough at presentation	11	11.50%
Respiratory distress at presentation	3	3.10%
UTI at presentation	1	1.00%
Oliguria/anuria at presentation	1	1.00%
Breathlessness at presentation	1	1.00%
Myalgias at presentation	6	6.30%
Total	96	100.00%

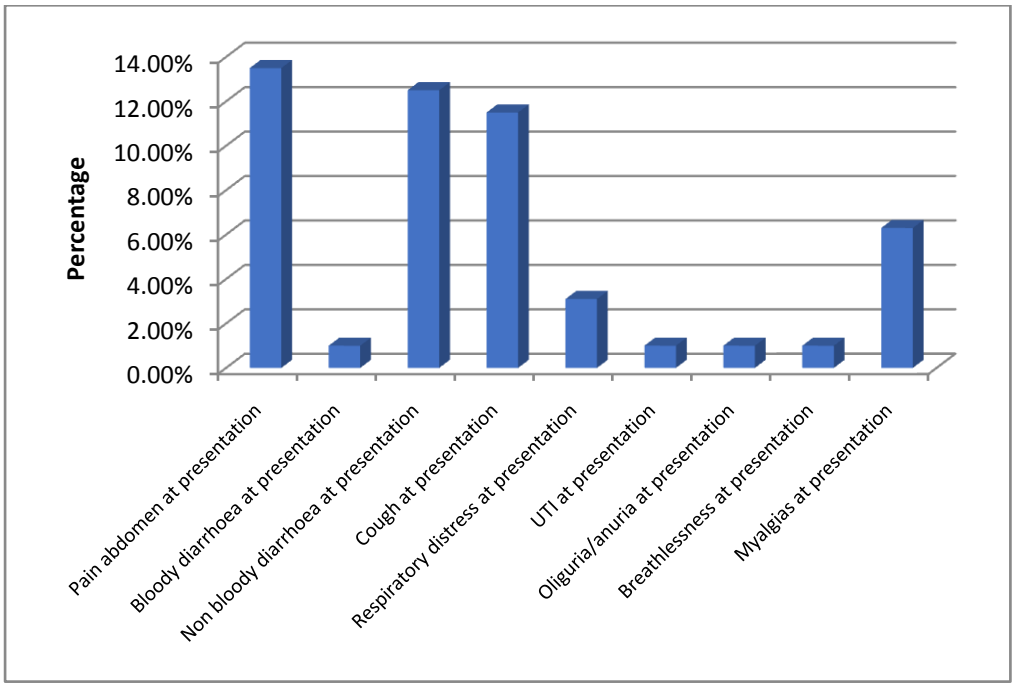


Figure 10: Distribution as per symptoms at presentation

SYMPTOMS DURING HOSPITAL STAY:

Table 9: Distribution as per symptoms during hospital stay

	Total	Percentage
Pain abdomen during hospital stay	2	2.10%
Bloody diarrhoea during hospital stay	3	3.10%
Non bloody diarrhoea during hospital stay	4	4.20%
Cough during hospital stay	5	5.20%
Respiratory distress during hospital stay	4	4.20%
UTI during hospital stay	1	1.00%
Seizures during hospital stay	1	1.00%
Myalgias during hospital stay	1	1.00%
Total	96	100.00%

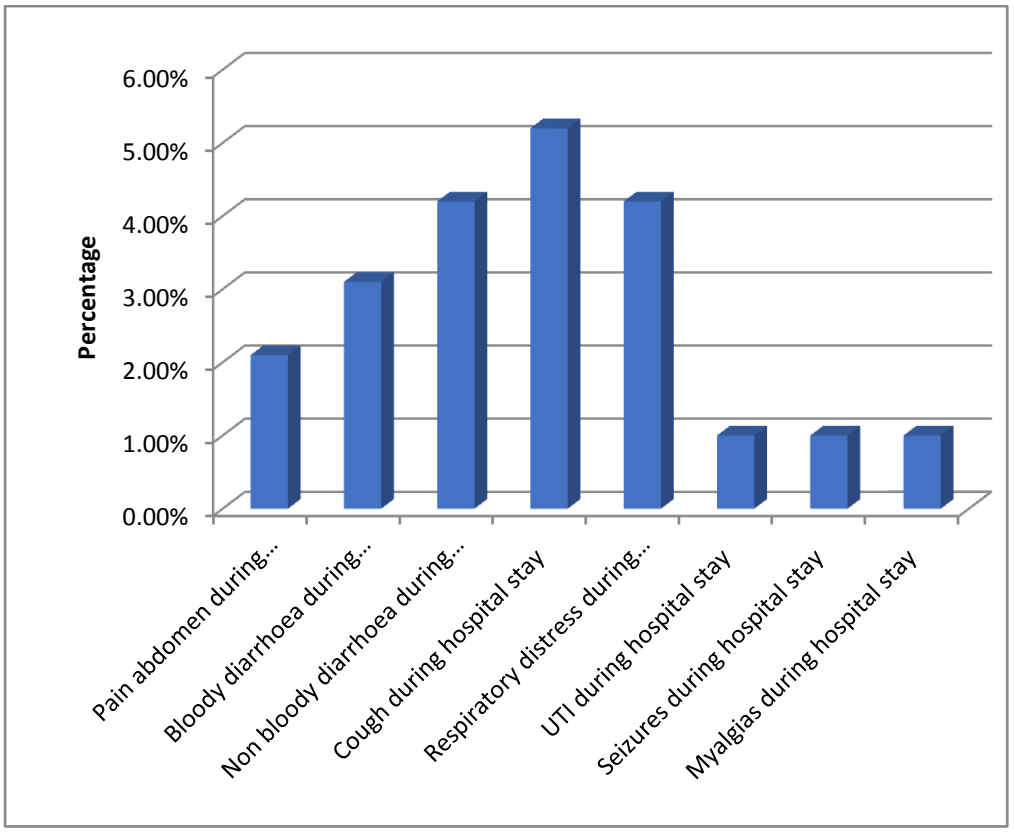


Figure 11: Distribution as per symptoms during hospital stay

Correlation between Risk stratification score and outcome:

A risk stratification score was calculated for all episodes with high risk FNand it was found that FN episodes who recovered within 1 week had mean risk stratification score of 8.45 (±1.38). Those FN episodes who recovered after 1 week had mean score of 9.12 (±1.62) and the FN episodes who expired had still higher risk stratification score of 10.50 (±1.00).p-value came out to be 0.013 (significant).

Table 10: Correlation between Risk stratification score and outcome

	with in 1 week (n=40)		> 1 week (n=52)		Mortality/DAMA (n=4)		F	p-value
	Mean	SD	Mean	SD	Mean	SD		
Score	8.45	1.38	9.12	1.62	10.50	1.00	4.590	0.013

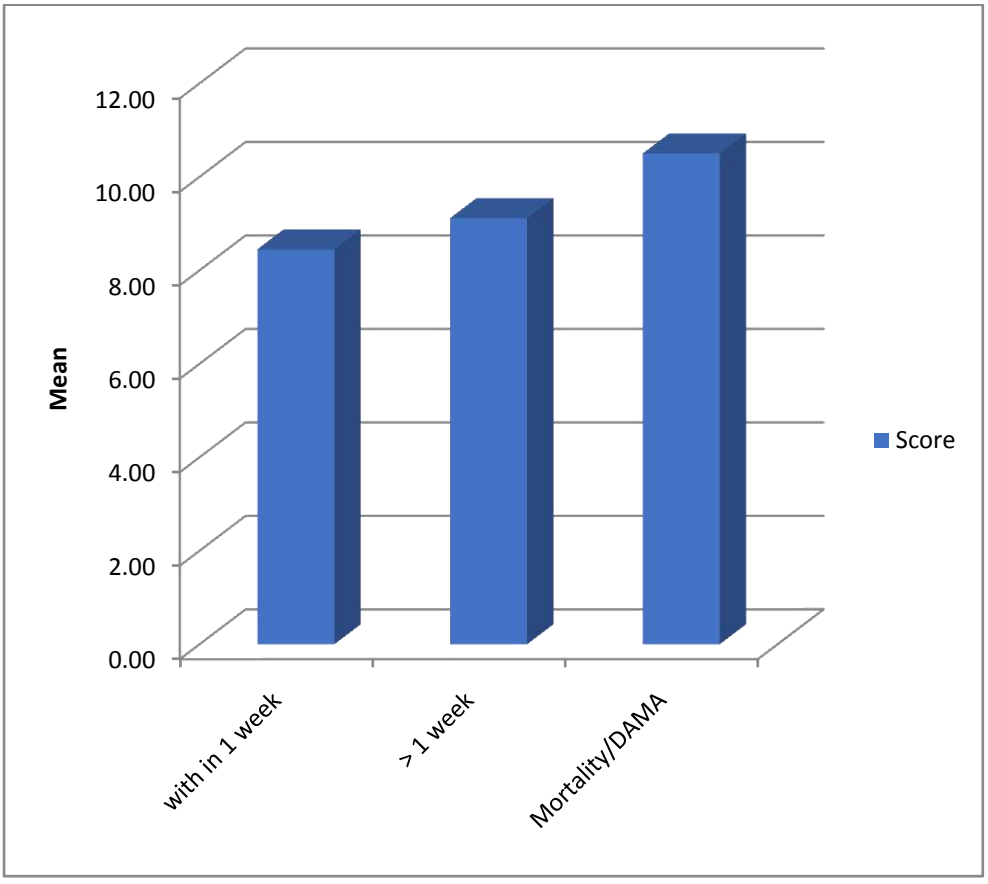


Figure 12: Correlation between Risk stratification score and outcome

VITALS:

About a quarter of FN episodes(22, 22.9%) had tachycardia; 13 (13.5%) had tachycardia at presentation and 9 (9.4%) had tachycardia during hospital stay.

Nearly one-fifth FN episodes (19, 19.8%) had tachypnea; 8 (8.3%) had tachypnea at presentation and 11 (11.5%) had tachypnea during hospital stay.

Twelve (12, 12.5%) had hypotension; 6 (6.3%) had hypotension at presentation and 6 (6.3%) had hypotension during hospital stay.

De-saturation was documented in 8 FN episodes (8, 8.3%); 3 (3.1%) had desaturation at presentation and 5 (5.2%) had desaturation during hospital stay.

Five (5, 5.2%) had prolonged CFT; 3 (3.1%) had prolonged CFT at presentation and 2 (2.1%) had prolonged CFT during hospital stay.

Table 11: Distribution of vitals

	Total	Percentage
Tachycardia	22	22.90%
Tachypnea	19	19.80%
Hypotension	12	12.50%
De-saturation	8	8.30%
Prolonged CFT (>2sec)	5	5.20%
Total	96	100.00%

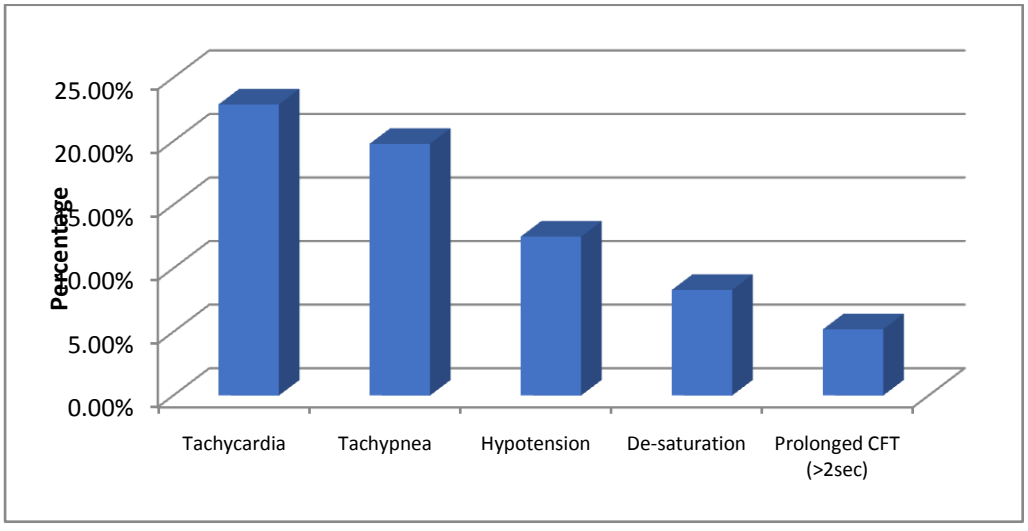


Figure 13: Distribution of vitals

Table 12: Distribution of vitals at presentation

	Total	Percentage
Tachycardia at presentation	13	13.50%
Tachypnea at presentation	8	8.30%
Hypotension at presentation	6	6.30%
De-saturation at presentation	3	3.10%
Prolonged CFT at presentation	3	3.10%
Total	96	100.00%

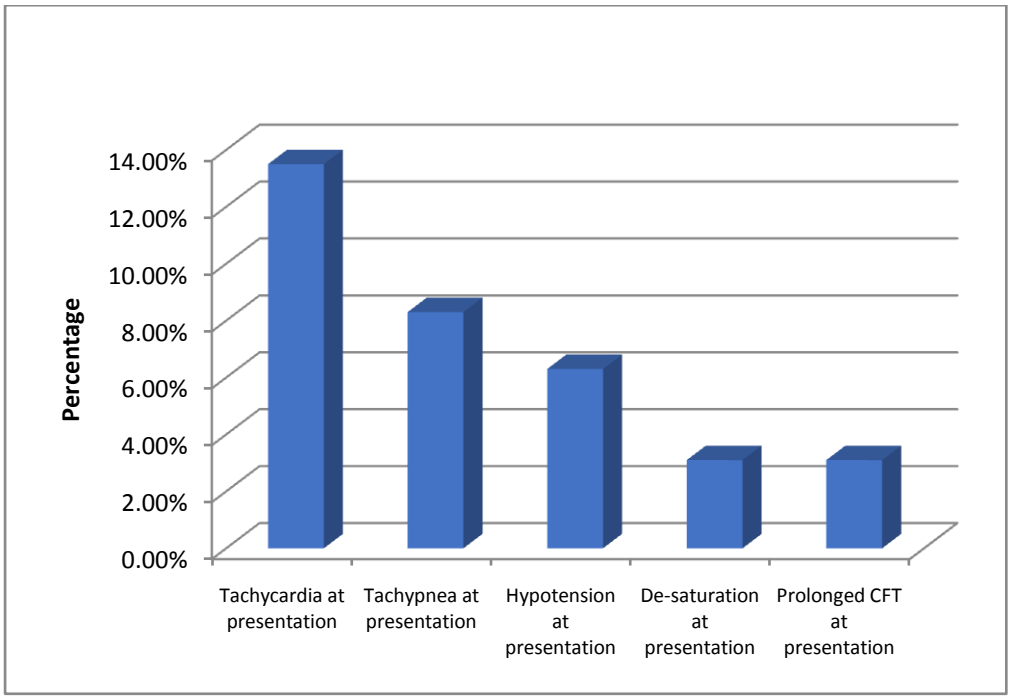


Figure 14: Distribution of vitals at presentation

Table 13: Distribution of vitals during hospital stay

	Total	Percentage
Tachycardia during hospital stay	9	9.40%
Tachypnea during hospital stay	11	11.50%
Hypotension during hospital stay	6	6.30%
De-saturation during hospital stay	5	5.20%
Prolonged CFT during hospital stay	2	2.10%

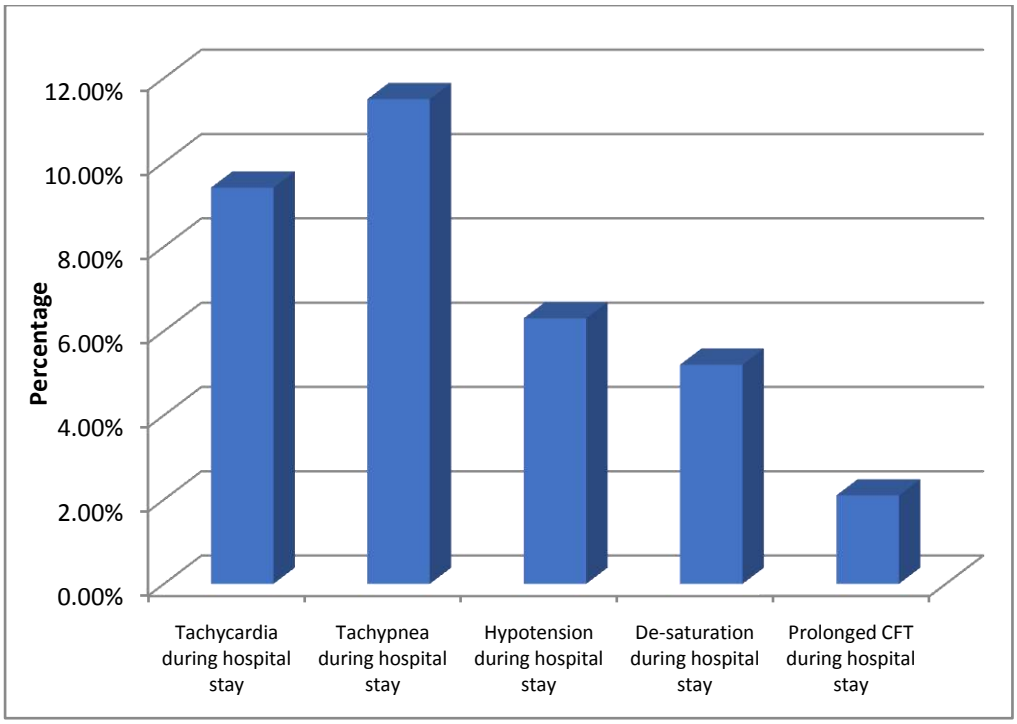


Figure 15: Distribution of vitals during hospital stay

INVESTIGATIONS:

HEMOGRAM:

The mean Hb was 8.86 gm/dl (±1.90).

Correlation between Hb and outcome:

We found that FN episodes who recovered within 1 week had higher Hb (9.02 ± 1.92) those who recovered after 1 week (8.69 ± 1.94). The FN episodes who had mortality had mean Hb of 9.40 ± 0.76. p-value came out to be insignificant (0.606).

Table 14: Mean Hemoglobin, RBC count, PCV, MCV, MCH, MCHC, RDW

	N	Minimum	Maximum	Mean	Std. Deviation
Hb (gm/dl) Day of admission	96	4.50	16.10	8.86	1.90
Hb (gm/dl) Day of discharge	96	6.70	14.40	9.64	1.74
RBC count (10^6/uL)) Day of admission	96	1.66	8.60	3.20	0.90
RBC count (10^6/uL) Day of discharge	96	2.25	9.40	3.42	0.84
PCV (%) Day of admission	96	3.07	48.20	26.97	6.29
PCV (%) Day of discharge	96	3.17	42.30	28.97	5.55
MCV (fL) Day of admission	96	64.80	115.70	87.08	7.39
MCV (fL) Day of discharge	96	72.50	108.00	87.55	6.39
MCH (Pg) Day of admission	96	18.80	37.80	28.41	2.47
MCH (Pg) Day of discharge	96	21.90	34.30	28.75	2.49

MCHC (gm/dl) Day of admission	96	26.30	35.60	32.59	1.23
MCHC (gm/dl) Day of discharge	96	29.70	37.40	32.82	1.35
RDW (%) Day of admission	96	11.80	34.20	17.30	3.37
RDW (%) Day of discharge	96	10.00	27.30	17.35	3.32

Correlation between TLC and outcome:

The mean TLC at admission was 1.25 x 10^3/uL (± 2.04).In our study, it was found that those who recovered within 1 week had higher TLC (1.52 ± 2.28) than those who recovered after 1 week (1.13 ± 1.90) or had mortality (0.15 ± 0.06). p-value came out to be insignificant (0.369).

Correlation between DLC (Neutrophil count) and outcome:

Those who recovered within 1 week had higher DLC (Neutrophil count) (29.10 ± 25.44) than those who recovered after 1 week (21.25 ± 25.51) or had mortality (3.75 ± 5.50). p-value came out to be insignificant (0.093).

Correlation between ANC and outcome:

The mean ANC was 502 per mm^3(±1305).

It was seen that those who recovered within 1 week had higher ANC (575.70 ± 1285.25) than those who recovered after 1 week (485 ± 1373.52) or had mortality (7.00 ± 11.34). p-value came out to be insignificant (0.705).

In our study, it was found that 78 (81.25%) FN episodes had ANC <500 and most (56.5%) of them recovered after 1 week and only few (38.5%) recovered within 1 week. Five (5%) of these FN episodes had mortality. p-value came out to be insignificant (0.311).

Table 15: Mean & Median TLC, DLC, ANC, Grade of neutropenia, Duration of neutropenia

	N	Mean	Std. Deviation	Minimum	Maximum	Percentiles		
	Valid					25	50	75
TLC (10^3/uL) Day of admission	96	1.25	2.04	0.10	10.80	0.40	0.70	1.18
TLC (10^3/uL) Day of discharge	96	2.39	1.69	0.10	8.00	1.20	1.90	3.10
DLC-N (%) Day of admission	96	23.79	25.46	1.00	89.00	2.00	12.50	38.00
DLC-L (%) Day of admission	96	38.04	32.07	1.00	96.00	6.00	29.50	67.75
DLC-N (%) Day of discharge	96	37.45	23.26	1.00	86.00	16.00	38.50	55.75
DLC-L (%) Day of discharge	96	39.40	23.31	1.00	97.00	19.25	41.00	54.50
ANC (per mm^3) Day of admission	96	502.88	1305.25	1.00	7700.00	9.25	94.00	402.75
ANC (per mm^3) Day of discharge	96	1110.47	1204.90	1.00	5236.00	285.00	633.50	1450.25
Grade of neutropenia	96	3.69	0.93	1.00	4.00	4.00	4.00	4.00
Day 3	96	3.68	0.75	0.00	4.00	4.00	4.00	4.00
Day 5	96	3.30	1.21	0.00	4.00	3.00	4.00	4.00
Day 7	96	2.23	1.82	0.00	4.00	0.00	3.00	4.00
Day 9	96	1.29	1.64	0.00	4.00	0.00	0.00	3.00
Day 11	96	0.68	1.29	0.00	4.00	0.00	0.00	0.75
Day 13	96	0.30	0.91	0.00	4.00	0.00	0.00	0.00
Duration of neutropenia(<500/mm3)	96	6.07	3.01	1.00	14.00	4.00	6.00	8.00

Profound neutropenia:

Profound neutropenia (ANC < 100 /mm^3) was seen in 49 (51.04%) FN episodes. A higher number of febrile neutropenia episodes with profound neutropenia recovered after 1 week (29, 55.77%) and fewer recovered within 1 week (16, 40.0%). It was seen that all the FN episodes who had mortality had profound neutropenia at presentation to hospital. p-value came out to be 0.044 (significant).

Table 16: Relationship of profound neutropenia with outcome

		Outcome						Total	Chi-square value	p-value
ANC		with in 1 week (n=40)		> 1 week (n=52)		Mortality/DAMA (n=4)				
	> 100	24	60.0%	23	44.23 %	0	0.0%	47	6.253	0.044
	< 100	16	40.0%	29	55.77 %	4	100%	49		

Duration of neutropenia:

The mean duration of neutropenia was 6.07 days (±3.01). It was seen that FN episodes recovering after 1 week had a longer duration of neutropenia than the episodes recovering within 1 week (7.15 days v/s 4.68 days respectively). p-value came out to be significant (0.001).

Table 17: Mean duration of neutropenia (<500/mm^3)

	Mean	Std. Deviation
Duration of neutropenia(<500/mm3)	6.07	3.01

Table 18: Relationship of duration of neutropenia with outcome

	with in 1 week (n=40)		> 1 week (n=52)		Mortality/DAMA (n=4)		F	p-value
	Mean	SD	Mean	SD	Mean	SD		
Duration of neutropenia	4.68	2.30	7.15	3.18	6.00	0.82	8.930	0.001

Correlation between Platelet count and outcome:

The mean Platelet count were 104.72 x 10^3/uL (±113.73). Those who recovered within 1 week had higher platelet count (124.98 ± 106.65) than those who recovered after 1 week (96.21 ± 119.72) or had mortality (12.75 ± 7.72). p-value came out to be insignificant (0.124).

Table 19: Mean Platelet count and MPV

	N	Minimum	Maximum	Mean	Std. Deviation
Platelets (10^3/uL)) Day of admission	96	5.00	655.00	104.72	113.73
Platelets (10^3/uL)) Day of discharge	96	6.00	836.00	197.26	177.78
MPV (fL) Day of admission	96	6.40	13.90	9.09	1.42
MPV (fL) Day of discharge	96	6.40	12.30	8.93	1.20

INFLAMMATORY MARKERS:

The mean PCT at admission was 3.75 ng/ml (±12.66) and mean CRP was 45.67 mg/lt (±57.53).

Correlation between PCT and outcome:

It was seen those who recovered within 1 week had lower PCT (1.54 ± 4.08) than those who recovered after 1 week (3.70 ± 9.50) or had mortality (33.93 ± 58.08). p-value came out to be significant (0.000).

In our study, it was found that 34 (35.41%) FN episodes had PCT > 0.5 and most (55.8%) of them recovered after 1 week and only few (38.2%) recovered within 1 week.Six (6%) of these FN episodes had mortality. p-value came out to be insignificant (0.760).

Correlation between CRP and outcome:

It was seen that FN episodes who recovered within 1 week had lower CRP (29.99 ± 33.91) than those who recovered after 1 week (50.39 ± 56.92) or had mortality (142.42 ± 136.45). p-value came out to be significant (0.000).

In our study, it was found that 74 (77.1%) FN episodes had CRP > 6 and most (56.7%) of them recovered after 1 week and only few (37.8%) recovered within 1 week.Almost 5.5% of these FN episodes had mortality. p-value came out to be insignificant (0.256).

Table 20: Mean PCT and CRP

	N	Minimum	Maximum	Mean	Std. Deviation
PCT	96	0.00	1.00	0.35	0.48
PCT (ng/ml) Day 1	93	0.03	101.00	3.75	12.66
PCT (ng/ml) Day 3	2	0.11	93.70	46.91	66.18
PCT (ng/ml) Day 5	19	0.04	56.19	7.61	16.23
CRP	96	0.00	1.00	0.77	0.42
CRP (mg/lt) Day 1	95	0.08	331.76	45.67	57.53
CRP (mg/lt) Day 3	7	6.14	344.30	105.21	119.30
CRP (mg/lt) Day 5	43	0.60	260.80	66.94	63.06
CRP (mg/lt) Day 7	2	4.85	64.25	34.55	42.00
CRP (mg/lt) Day 9	15	3.99	143.80	73.52	46.50
CRP (mg/lt) Day 11	2	9.28	33.59	21.44	17.19
CRP (mg/lt) Day 13	5	3.06	153.27	64.34	65.46

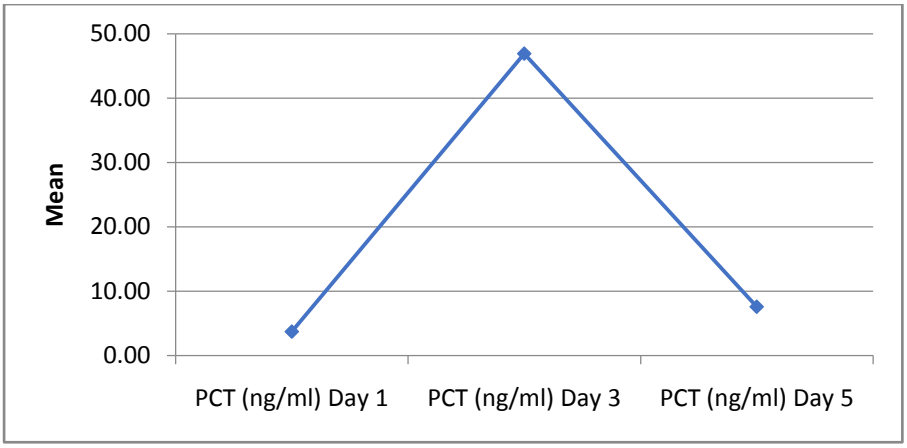


Figure 16: Trend of PCT

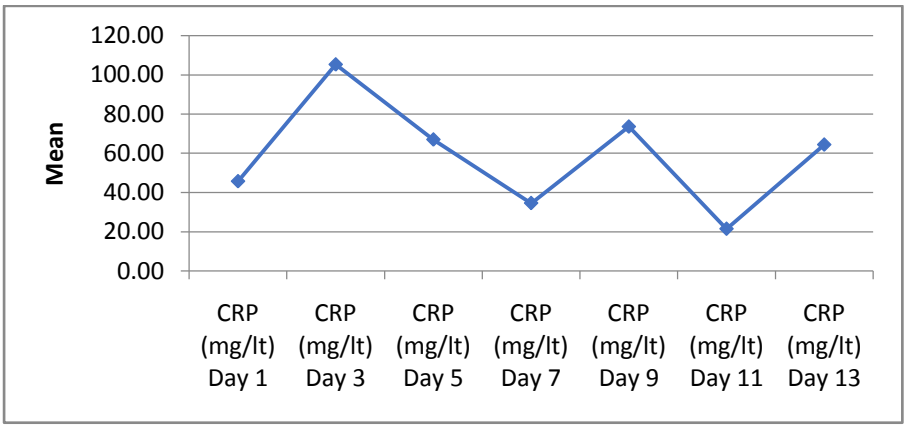


Figure 17: Trend of CRP

Correlation between PCT and CRP:

PCT came out to be positive in 34 (35.4%) FN episodes and CRP came out to be positive in 74 (77%) episodes,

Both PCT and CRP came out to be positive in 29 (39.2%) episodes, and

Both PCT and CRP came out to be negative in 17 (17.7%) episodes.

Table 21: Correlation between PCT and CRP

		CRP				Total	Chi-square value	p-value
		< 6		> 6				
PCT	< 0.5	17	77.3%	45	60.8%	62	2.009	0.2
	> 0.5	5	22.7%	29	39.2%	34		
Total		22	100.0%	74	100.0%	96		

RFT:

Correlation between Creatinine and outcome:

Those who recovered within 1 week had lower creatinine (0.30 ± 0.13) than those who had mortality (0.52 ± 0.18). p-value came out to be significant (0.005).

Table 22: Mean Urea, Creatinine, Na, K, Cl

	N	Minimum	Maximum	Mean	Std. Deviation
Urea (mg/dl) Day of admission	84	5.00	56.00	20.24	9.11
Urea (mg/dl) Day of discharge	30	4.00	78.00	12.50	13.58
Creatinine (mg/dl) Day of admission	85	0.07	0.76	0.30	0.14
Creatinine (mg/dl) Day of discharge	30	0.07	0.62	0.26	0.14
Na Day of admission	89	129.00	143.00	135.51	3.40
K Day of admission	89	2.31	4.89	3.91	0.46
CL Day of admission	89	91.00	110.00	100.96	4.13
Na Day of discharge	30	127.00	164.00	138.27	6.28
K Day of discharge	30	2.29	5.15	3.63	0.62
CL Day of discharge	30	97.00	123.00	104.93	6.47

LFT:

Correlation between T.Bilirubin and outcome:

In our study, it was found that FN episodes who recovered within 1 week had lower T.Bilirubin(0.68 ± 0.37) than those who recovered after 1 week (0.73 ± 0.42) or had mortality (0.99 ± 0.24). p-value came out to be insignificant (0.422).

Correlation between D.Bilirubin and outcome:

The FN episodes who recovered within 1 week had lower D.Bilirubin(0.21 ± 0.14) than those who recovered after 1 week (0.25 ± 0.14) or had mortality (0.50 ± 0.30). p-value came out to be significant (0.000).

Correlation between S.Albumin and outcome:

The mean albumin at admission was 3.89 g/dl (±0.52).

In our study, it was found that FN episodes who recovered within 1 week had higher S.Albumin(4.10 ± 0.44) than those who recovered after 1 week (3.82 ± 0.42) or had mortality (3.07 ± 1.06). p-value came out to be significant (0.000).

Table 23: Mean T.Bilirubin, D.Bilirubin, SGOT, SGPT, ALP, T.Proteins, S.Albumin

	N	Minimum	Maximum	Mean	Std. Deviation
T.BIL Day of admission	78	0.11	2.53	0.72	0.39
D.BIL (mg/dl) Day of admission	78	0.04	0.83	0.24	0.16
T.BIL (mg/dl) Day of discharge	18	0.16	2.28	0.77	0.60
D.BIL (mg/dl) Day of discharge	18	0.04	2.04	0.35	0.51
SGOT Day of admission	84	8.00	234.00	44.61	33.67
SGPT (U/L) Day of admission	85	8.00	302.00	63.15	50.88
SGOT(U/L) Day of discharge	18	7.00	88.00	34.33	22.27
SGPT (U/L) Day of discharge	18	5.00	175.00	42.67	42.01
ALP (U/L) Day of admission	77	49.00	339.00	146.94	63.21
ALP (U/L) Day of discharge	18	48.00	274.00	118.22	65.89
T.Proteins (g/dl) Day of admission	77	4.50	61.00	6.69	6.32
T.Proteins (g/dl) Day of discharge	18	3.40	7.30	5.07	1.02
S.Albumin (g/dl) Day of admission	78	1.66	4.78	3.89	0.52
S.Albumin (g/dl) Day of discharge	18	2.12	4.77	3.11	0.72

Table 24: Correlation between TLC, DLC, ANC, Platelet count, Hb, RBC count, PCV, MCV, MCH, RDW, PCT, CRP, Urea, Creatinine, Na, K, Cl, T.Bilirubin, D.Bilirubin, SGOT, SGPT, ALP, T.Proteins, S.albumin and outcome

	with in 1 week (n=40)		> 1 week (n=52)		Mortality / DAMA (n=4)		F	p-value
	Mean	SD	Mean	SD	Mean	SD		
TLC (10^3/uL) Day of admission	1.52	2.28	1.13	1.90	0.15	0.06	1.009	0.369
DLC-N (%) Day of admission	29.10	25.44	21.25	25.51	3.75	5.50	2.439	0.093
ANC (per mm^3) Day of admission	575.70	1285.25	485.00	1373.52	7.00	11.34	0.351	0.705
Platelets (10^3/uL) Day of admission	124.98	106.65	96.21	119.72	12.75	7.72	2.138	0.124
Hb (gm/dl) Day of admission	9.02	1.92	8.69	1.94	9.40	0.76	0.503	0.606
RBC count (10^6/uL) Day of admission	3.36	1.13	3.07	0.70	3.33	0.25	1.233	0.296

PCV (%) Day of admission	27.40	7.12	26.55	5.84	28.08	2.24	0.264	0.769
MCV (fL) Day of admission	87.62	8.15	86.87	7.03	84.35	3.11	0.396	0.674
MCH (Pg) Day of discharge	28.85	2.65	28.79	2.44	27.30	0.84	0.710	0.494
RDW (%) Day of admission	17.32	3.96	17.33	2.95	16.75	2.66	0.055	0.947
PCT (ng/ml) Day 1	1.54	4.08	3.70	9.50	33.93	58.08	11.153	0.000
CRP (mg/lt) Day 1	29.99	33.91	50.39	56.92	142.42	136.45	8.479	0.000
Urea (mg/dl) Day of admission	18.37	6.78	20.44	8.42	34.25	20.76	6.158	0.003
Creatinine (mg/dl) Day of admission	0.30	0.13	0.28	0.13	0.52	0.18	5.633	0.005
Na Day of admission	136.56	3.12	135.06	3.42	131.50	1.00	5.397	0.006
K Day of admission	4.06	0.38	3.84	0.48	3.38	0.43	5.617	0.005

CL Day of admission	101.89	3.69	100.49	4.38	98.25	2.99	2.148	0.123
T.BIL Day of admission	0.68	0.37	0.73	0.42	0.99	0.24	0.874	0.422
D.BIL (mg/dl) Day of admission	0.21	0.14	0.25	0.14	0.50	0.30	5.527	0.006
SGOT Day of admission	43.25	27.47	46.02	38.83	39.67	23.35	0.099	0.906
SGOT(U/L) Day of discharge	24.00	16.09	34.83	22.55	42.67	29.91	0.505	0.614
ALP (U/L) Day of admission	148.97	67.10	147.43	62.21	118.33	37.45	0.319	0.728
T.Proteins (g/dl) Day of admission	6.20	0.80	7.12	8.54	5.83	1.53	0.216	0.806
S.Albumin (g/dl) Day of admission	4.10	0.44	3.82	0.42	3.07	1.06	9.777	0.000

Table 25: Correlation between ANC, PCT, CRP and outcome

		Outcome						Total	Chi-square value	p-value
		within 1 week (n=40)		> 1 week (n=52)		Mortality/DAMA (n=4)				
ANC	> 500	10	25.0%	8	15.38%	0	0.0%	18	2.335	0.311
	< 500	30	75.0%	44	84.62%	4	100.0%	78		
PCT	< 0.5	27	67.5%	33	63.46%	2	50.0%	62	0.549	0.760
	> 0.5	13	32.5%	19	36.54%	2	50.0%	34		
CRP	< 6	12	30.0%	10	19.23%	0	0.0%	22	2.725	0.256
	> 6	28	70.0%	42	80.77%	4	100.0%	74		

BLOOD CULTURE:

Blood cultures were sent in all FN episodes, and growth of micro-organisms was seen in about one-sixth (15, 15.6%) of the episodes. Klebsiella pneumoniae (3.1%) and Pseudomonas aeruginosa (3.1%) were the commonest organisms seen, followed by MRSA (2.1%), Enterobacter cloacae (2.1%),E.coli(2.1%), Acinetobacter baumanii (1.7%), Klebsiella oxytoca (1.7%) and Streptococcus agalactiae (1.7%).

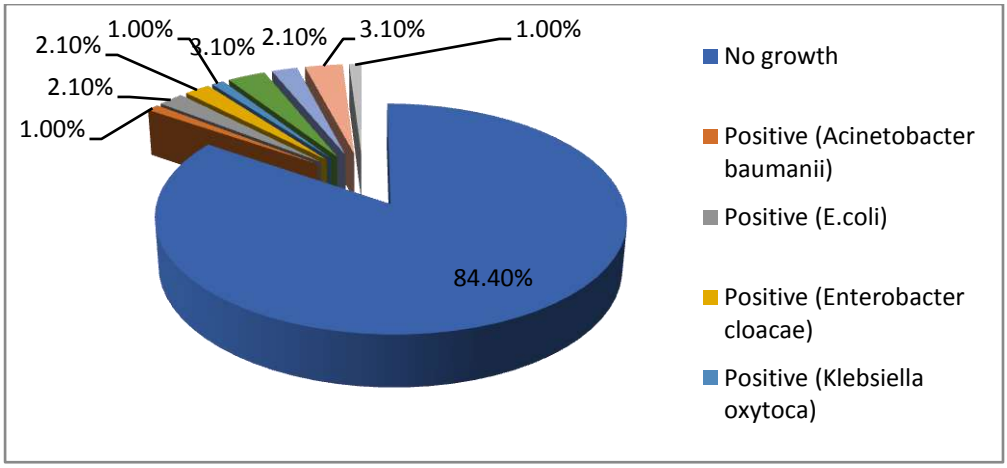


Figure 18: Distribution of positive blood cultures

Table 26: Culture sensitivity pattern of positive blood cultures (Sensitive/No. of positive cultures)

ORGANISM IN BLOOD CULTURE	No. of positive	Amp-Sulb	Amikacin	Piperacillin	Tazo-bactam	Cefoperazone-sulbactam	Colistin	Doxycycline	Ceftazidime	Cefepime	Ciprofloxacin	Piperacillin-tazobactam	Linezolid	Vancomycin
Acinetobacter baumannii	1	1/1	1/1	1/1	1/1	1/1	1/1	-	1/1	1/1	1/1	-	-	-
Pseudomonas	3	1/3	3/3	2/3	3/3	-	-	-	3/3	3/3	3/3	3/3	-	-
E.coli	2	0/2	2/2	0/2	0/2	2/2	0/2	1/2	0/2	0/2	0/2	2/2	-	-
Enterobacter cloacae	2	2/2	2/2	-	2/2	2/2	-	-	-	2/2	2/2	2/2	-	-
Klebsiella pneumoniae	3	0/3	0/3	0/3	0/3	0/3	0/3	0/3	-	0/3	0/3	0/3	-	-
Streptococcus agalactiae	1	-	-	-	-	-	-	-	-	-	-	-	1/1	1/1
Klebsiella oxytoca	1	0/1	0/1	0/1	0/1	0/1	0/1	0/1	-	0/1	0/1	0/1	-	-
MRSA	2	-	-	-	-	1/2	-	-	-	-	0/2	2/2	2/2	2/2

URINE ROUTINE:

Urine routine sent showed pus cells in 12.5% of FN episodes whereas majority had no pus cells.

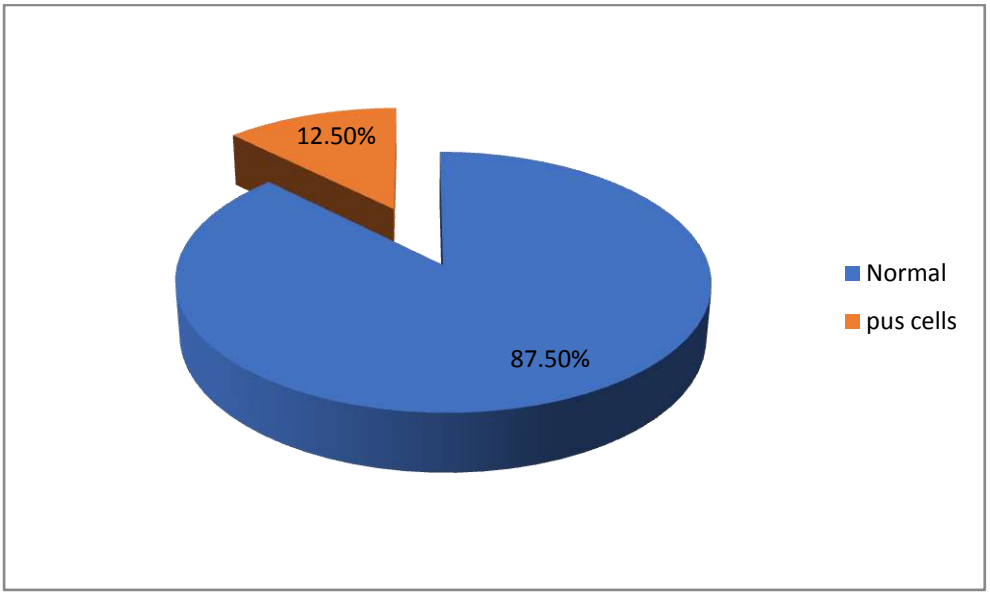


Figure 19: Distribution of pus cells in urine routine

URINE CULTURE:

Growth of micro-organism was seen in only about 10% of patients and the most common organisms isolated were E.coli (4.2%) followed by Klebsiella pneumoniae(2.1%), Pseudomonas aeruginosa (2.1%), Klebsiella ozaenae (1%), Enterococcus (1%) and Serratia liquefaciens(1%).

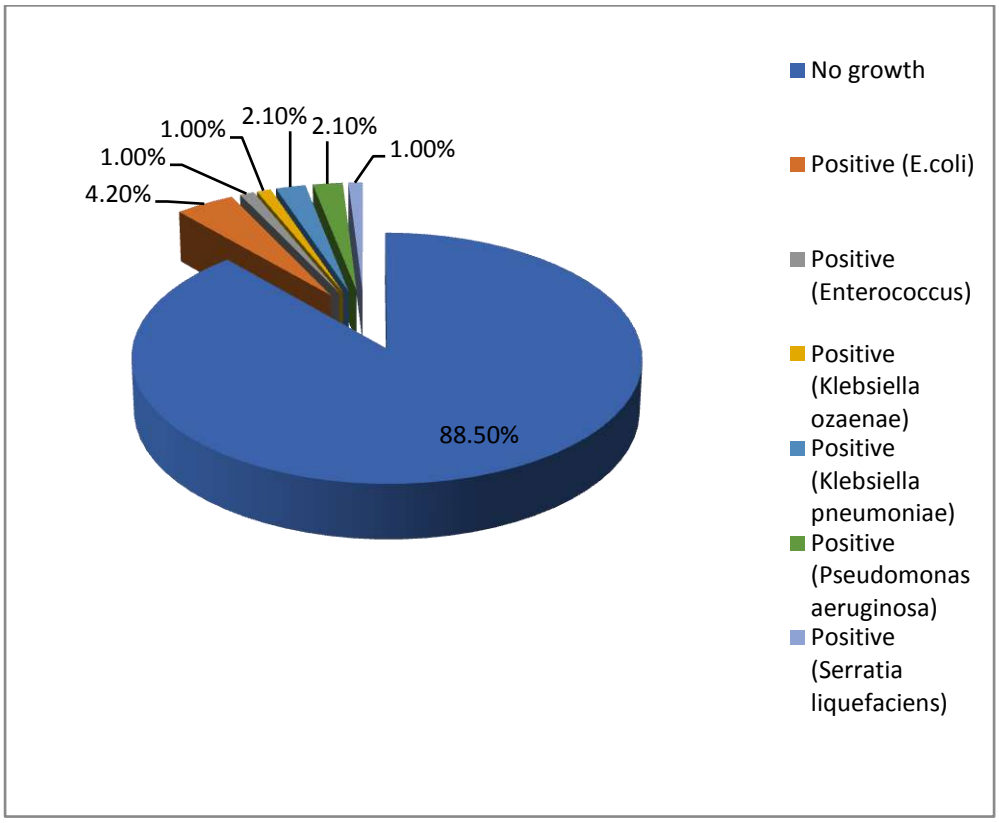


Figure 20: Distribution of positive urine cultures

Table 27: Culture sensitivity pattern of positive urine cultures (Sensitive/No. of positive cultures)

ORGANISM IN URINE CULTURE	Cefoperazone-Sulbactam	Amikacin	Meropenem	Piperacillin-Tazobactam	Cotrimoxazole	Ceftazidime	Cefepime	Ciprofloxacin	Gentamicin	Linezolid	Vancomycin	Teicoplanin	Tetracycline	Nitrofurantoin	Norfloxacin	Fosfomycin
Enterococcus faecium (1)	-	-	-	-	-	-	-	0/1	0/1	1/1	0/1	0/1	0/1	-	-	-
Serratia liquefaciens (1)	-	0/1	0/1	0/1	-	0/1	0/1	-	0/1	-	-	-	-	1/1	0/1	1/1
E.coli (4)	4/4	4/4	-	2/4	0/4	2/4	-	0/4	2/4	-	-	-	-	4/4	2/4	4/4
Pseudomonas aeruginosa (2)	2/2	0/2	0/2	0/2	-	0/2	-	0/2	0/2	-	-	-	-	-	0/2	-
Klebsiella pneumoniae (2)	0/2	0/2	0/2	0/2	0/2	0/2	0/2	0/2	0/2	-	-	-	-	0/2	0/2	1/2
Klebsiella ozaenae (1)	0/1	01/	0/1	0/1	0/1	0/1	0/1	0/1	0/1	-	-	-	-	0/1	0/1	1/1

Co-relation between Urine routine and culture:

Pus cells were seen in 10 episodes of FN, but urine culture came out to be positive only in 2 of these episodes. Urine culture came out to be positive in 9 episodes, of which only 2 episodes had pus cells in urine routine. This signifies that urine could be the focus of infection without evidence of pyuria in urine routine.

Table 28: Correlation between urine routine and urine culture

		Urine routine		Total
		normal	pus cells	
Urine culture	No growth	75	10	85
	Positive (E.coli)	3	1	4
	Positive (Enterococcus)	1	0	1
	Positive (Klebsiella ozaenae)	1	0	1
	Positive (Klebsiella pneumoniae)	1	1	2
	Positive (Pseudomonas aeuginosa)	2	0	2
	Positive (Serratia liquefaciens)	1	0	1
Total		84	12	96

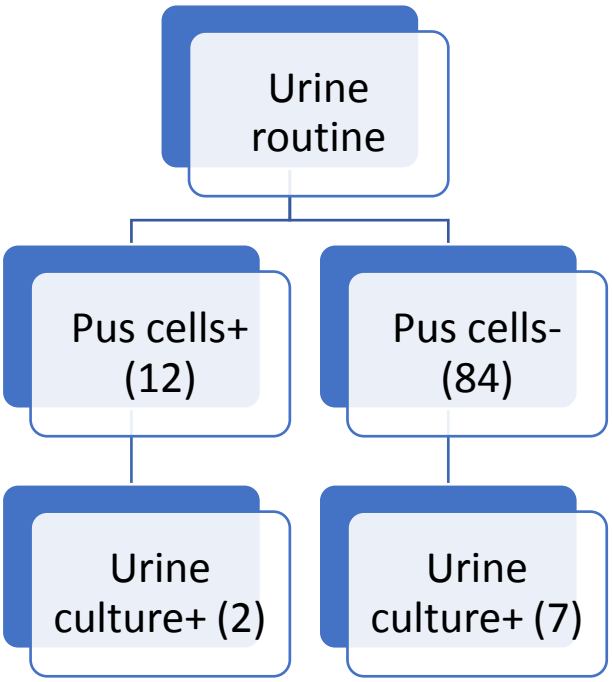


Figure 21: Correlation between urine routine and urine culture

Chest X-ray:

Chest X-ray was found to be normal in 79 (82.3%) FN episodes, opacities in 12 (12.5%), infiltrates in 2 (2.1%), increased broncho-vascular markings in 1 (1%), consolidation & pleural effusion in 1 (1%) and collapse in 1 (1%) FN episode.

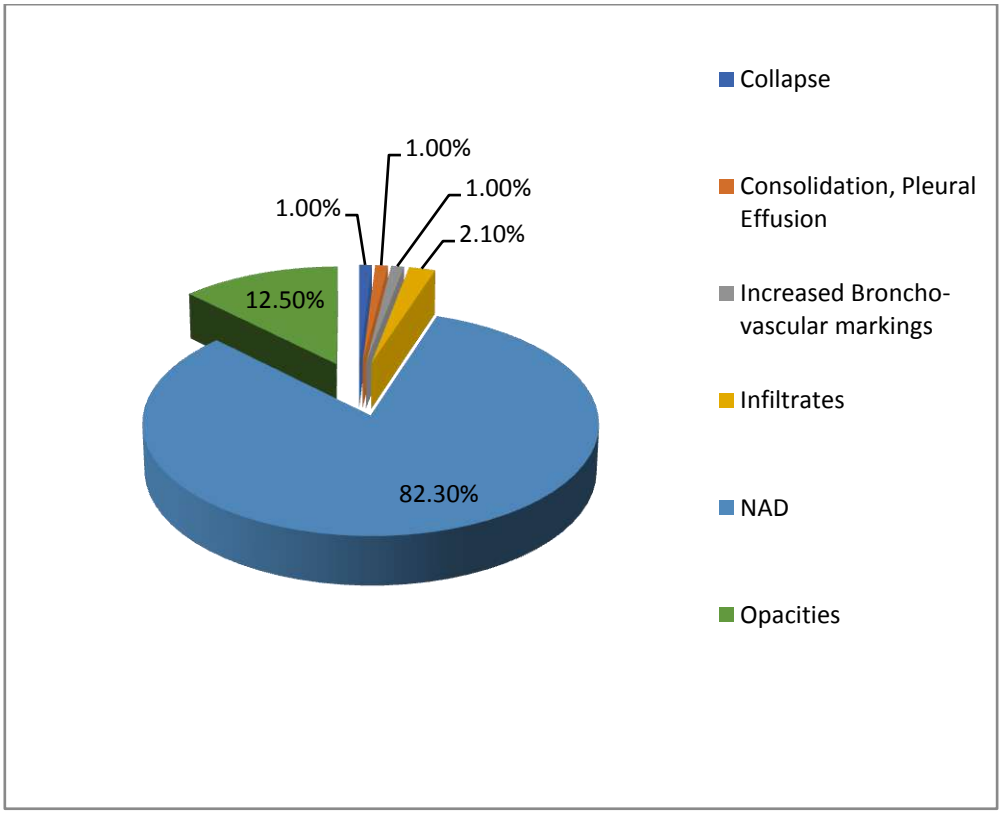


Figure 22: Findings on Chest X-ray

CT Chest:

CT chest was done in 7 (7.3%) FN episodes in our study (in those patients whose fever persisted despite hiking up of antibiotics or who tested positive for COVID).

Table 29: Findings on CT Chest

		Total	
	Findings on CT Chest		
	Anterior mediastinal mass, normal lung parenchyma	1	1.00%
	Bilateral pulmonary nodules s/o metastases	1	1.00%
	Small air space nodules at basal segments bilateral lower lobes, COVID positive	1	1.00%
	Centrilobular nodules in right middle lobe	1	1.00%
	Consolidation, Cavitation, COVID positive	1	1.00%
	CT Chest-NAD, COVID positive	1	1.00%
	No lung parenchyma involvement	1	1.00%
Total		96	100.00%

COVID RT-PCR:

All patients were tested for COVID RT-PCR. A total of 8 (8.3%) patients tested positive for COVID.

Galactomannan:

A total of 28 FN episodes were tested for galactomannan, and out of them, 11 (11.5%) tested positive for galactomannan and 17 (17.7%) tested negative for galactomannan.

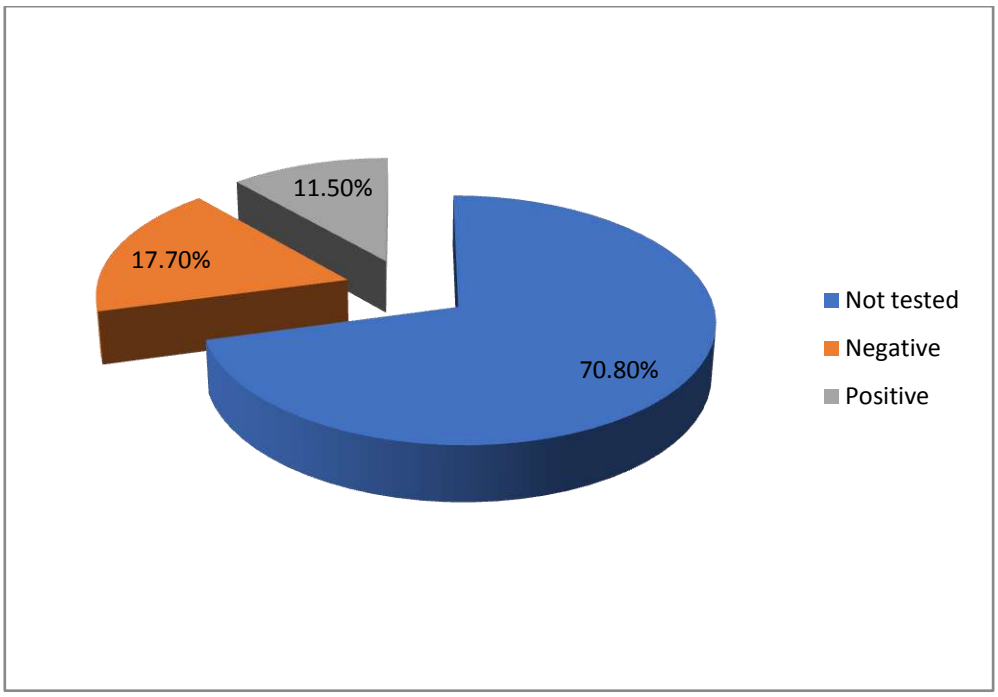


Figure 23: Distribution of Galactomannan

In our study, it was found that 11 (11.4%) FN episodes tested positive for Galactomannan and most of them (54.5%) recovered after 1 week and few (27.2%) recovered within 1 week. About one-fifth (18.2%) of these episodes had mortality.

p-value came out to be significant (0.010).

Table 30: Correlation between Galactomannan and outcome

		Outcome						Total	Chi-square value	p-value
		within 1 week (n=40)		> 1 week (n=52)		Mortality/DAMA (n=4)				
Galactomannan	Not tested	34	85.0%	32	61.54%	2	50.0%	68	13.301	0.010
	Negative	3	7.5%	14	26.92%	0	0.0%	17		
	Positive	3	7.5%	6	11.54%	2	50.0%	11		

Clostridium difficile:

In patients presenting with diarrhoea**,** Clostridium difficile was sent in 8 patients and 2 (2.1%) tested positive for Clostridium difficile and 6 (6.3%) tested negative for Clostridium difficile.

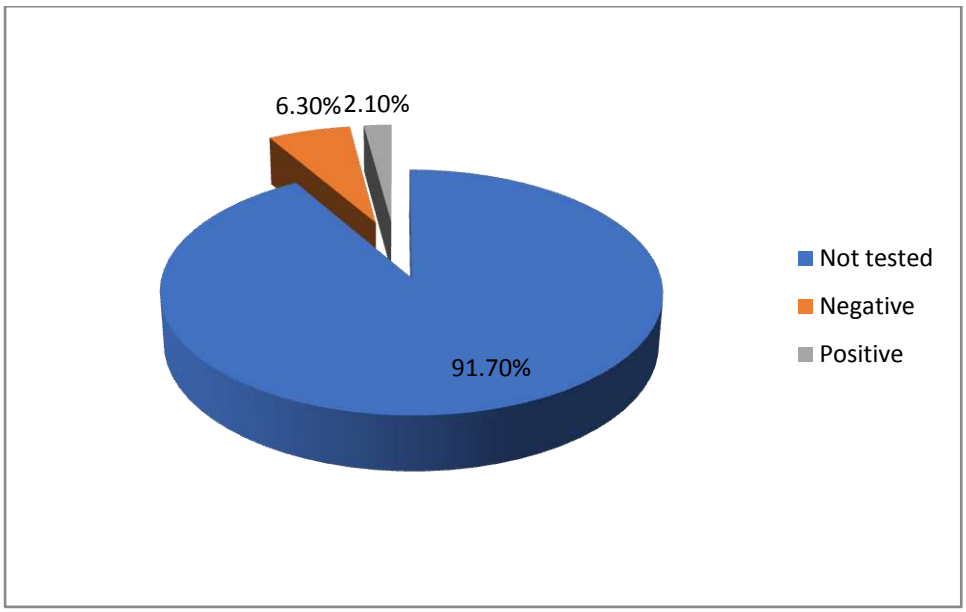


Figure 24: Distribution of Clostridium difficile

HOSPITAL COURSE:

ANTIBIOTICS GIVEN:

Empirical antibiotics as per the protocol (Cefoperazone-Sulbactam, Amikacin) were administered in 88 (91.7%) FN episodes. Antibiotics were hiked up to 2nd line antibiotics in 51 (53.1%) episodes and to 3rd line antibiotics in 5 (5.2%) episodes.

Table 31: Distribution of antibiotics

Responding to first line antibiotics	88	91.67%
Need to step up antibiotics to 2nd line	51	53.13%
Need to step up antibiotics to 3th line	5	5.21%

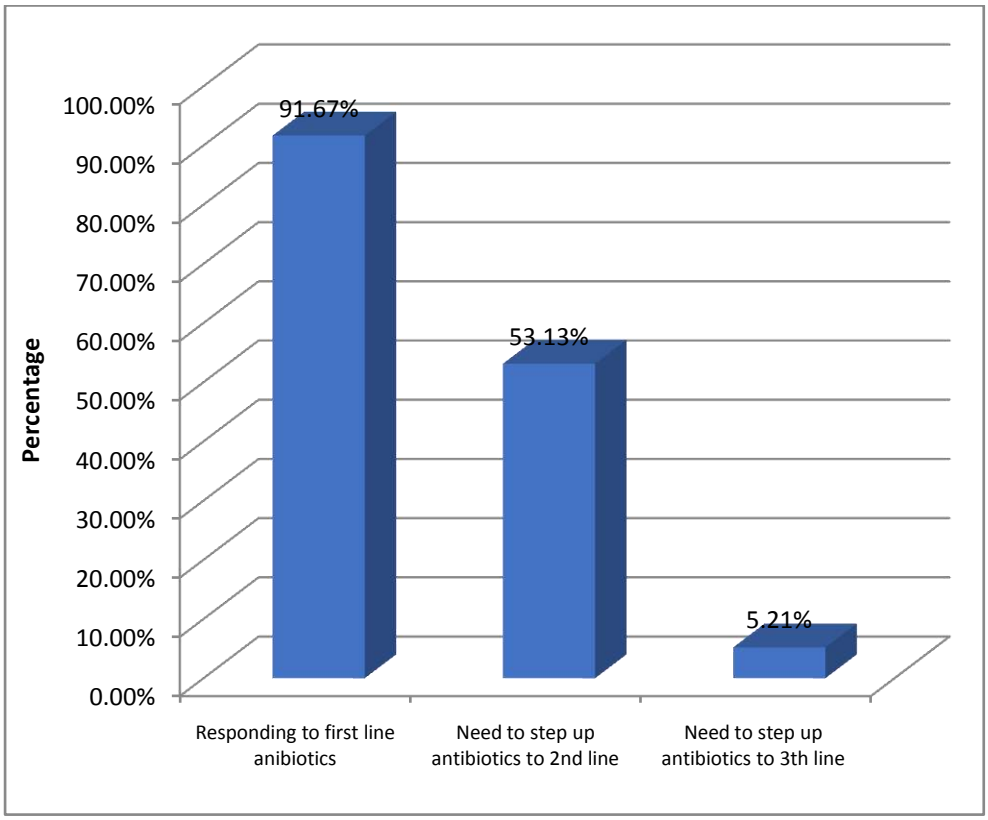


Figure 25: Distribution of antibiotics

FUNGAL INFECTION & NEED OF ANTI-FUNGALS:

Suspicion of possible fungal infection was present in 51% (49) FN episodes, probable in 3.1% (3) and fungal infection could be proven in 11.46% FN episodes. Anti-fungals were given in 54 (56.25%) FN episodes.

Table 32: Distribution of fungal infection

		Total	
Fungal infection	Possible fungal infection	49	51.04%
	Probable fungal infection	3	3.13%
	Proven fungal infection	11	11.46%
Total		96	100.00%

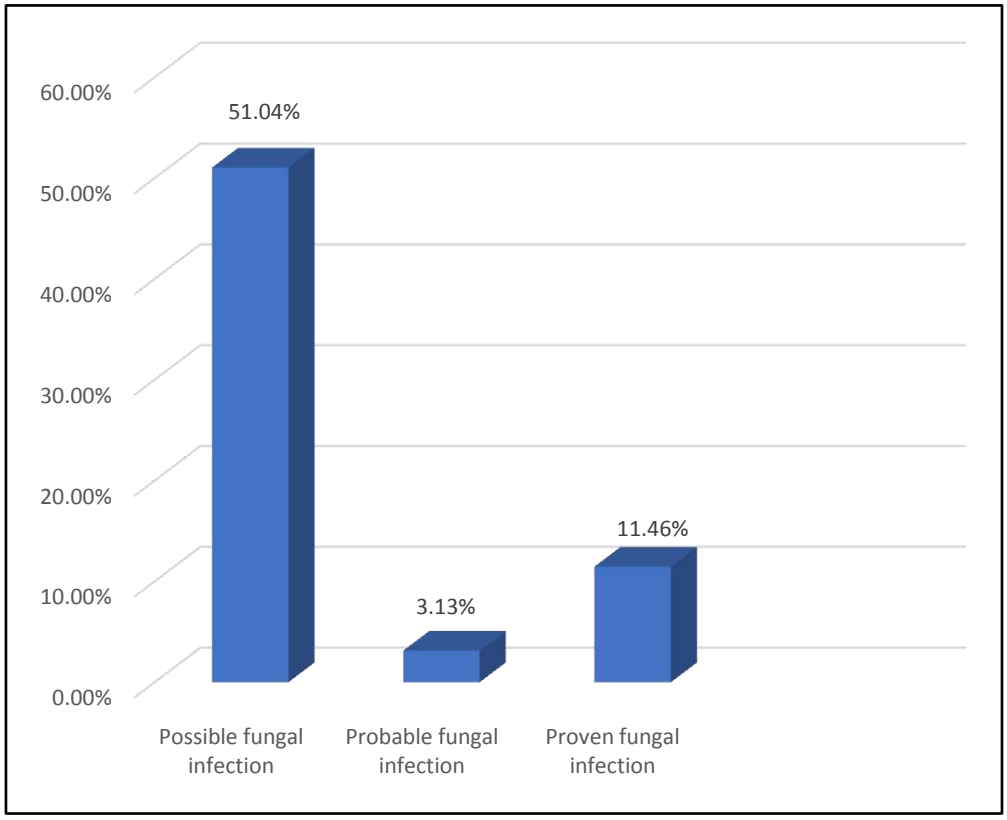


Figure 26: Distribution of fungal infection

NEED OF ANTI-VIRALS:

Anti-virals(Acyclovir) were given in only 1 (1%) patient with Herpes labialis.

TIME TO DEFERVESCENCE:

The average time to defervescence of fever was 6.77 days (±3.97). It was seen that FN episodes taking longer time to defervescence of fever took longer time to recovery. The FN episodes recovering within 1 week had a mean time to defervescence of 4.38 (± 1.60) days whereas those recovering after 1 week had a mean time to defervescence of 8.62 (±4.26) days. p-value came out to be significant (0.001).

Table 33: Time to defervescence of fever

	N	Mean	Std. Deviation	Minimum	Maximum	Percentiles		
						25	50	75
Time to defervescence (days)	92	6.77	3.97	1.00	20.00	4	6	10

Table 34: Time to defervescence of fever and outcome

	with in 1 week (n=40)		> 1 week (n=52)		F	p-value
	Mean	SD	Mean	SD		
Time to defervescence (days)	4.38	1.60	8.62	4.26	35.671	0.001

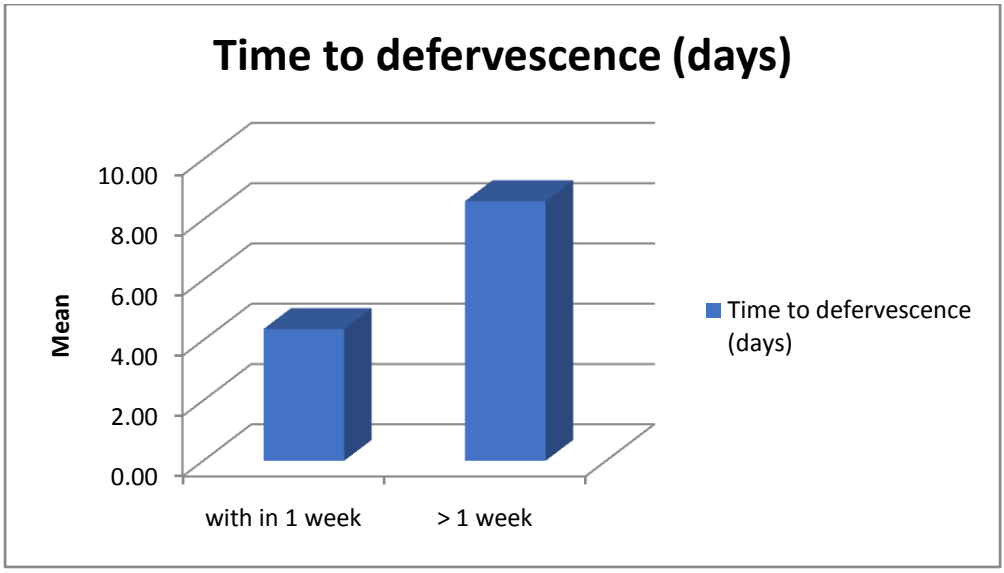


Figure 27: Time to defervescence of fever and outcome

REQUIREMENT OF OXYGEN, VENTILATION, INOTROPES, BLOOD PRODUCTS, PICU TRANSFER:

Requirement of oxygen was seen in seventeen (17, 17.7%) episodes. Non-invasive ventilation was initiated in less than 10 percent (7, 7.3%) episodes and failure of non-invasive ventilation was seen in 4 (4.2%) episodes, who were put on invasive ventilation. Inotropes were required in 7 (7.3%) episodes. Transfer to PICU was required in 7 (7.3%) episodes.Blood products were required in two-third (65, 67.7%) episodes.

Table 35: Distribution of requirement of oxygen, requirement of ventilation, requirement of inotropes, requirement of PICU and requirement of blood products

	Total	Percentage
Requirement of oxygen	17	17.70%
Requirement of ventilation	7	7.30%
Requirement of inotropes	7	7.30%
Requirement of PICU	7	7.30%
Requirement of blood products	65	67.70%
Total	96	100.00%

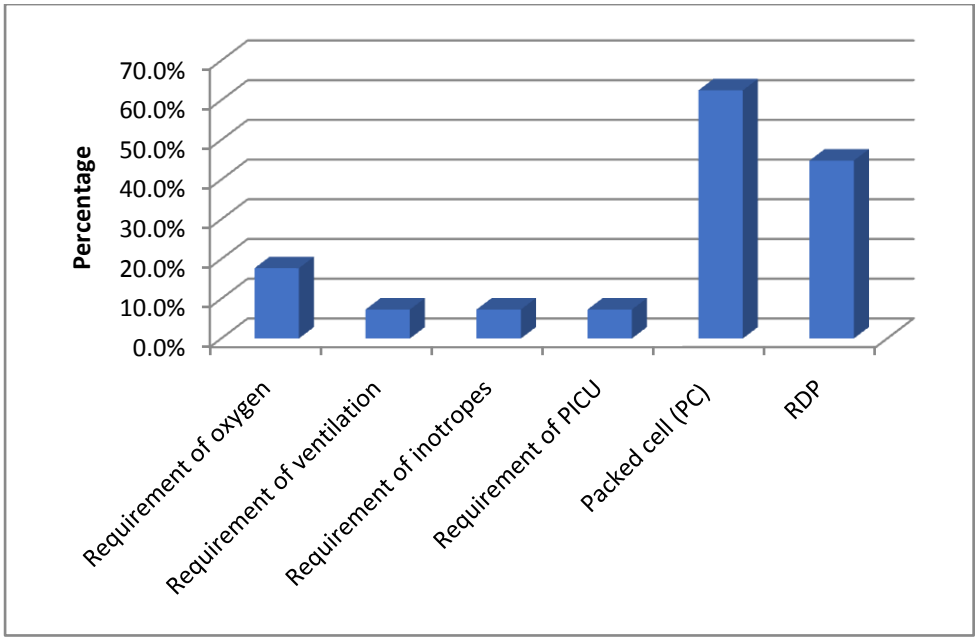


Figure 28: Distribution of requirement of oxygen, requirement of ventilation, requirement of inotropes, requirement of PICU and requirement of blood products

Correlation between 'Requirement of oxygen' and outcome:

In our study, it was found that 17 (17.7%) FN episodes had requirement of oxygen, and most (53.0%) of them recovered after 1 week and only few (23.5%) recovered within 1 week. About one-fifth (23.5%) of these FN episodes had mortality. p-value came out to be significant (0.001).

Correlation between 'Requirement of ventilation' and outcome:

Seven (7, 7.3%) FN episodes had requirement of ventilation, and most (28.6%) of them recovered after 1 week and only few (14.3%) recovered within 1 week. More than half (57.1%) of these episodes had mortality. p-value came out to be significant (0.001).

Correlation between 'Requirement of inotropes' and outcome:

It was found that 7 (7.3%) FN episodes had requirement of inotropes, and most (57.1%) of them had mortality and only few (42.9%) recovered after 1 week. None of the FN episodes who recovered within one week required inotropes. p-value came out to be significant (0.001).

Correlation between 'Duration of PICU stay (days)' and outcome:

The FN episodes who recovered within 1 week had no requirement of PICU. Those who recovered after 1 week had increasedduration of PICU stay (days)(5.67 ± 4.04) than those who had mortality (3.75 ± 2.36). p-value came out to be insignificant (0.461).

Correlation between 'Requirement of anti-fungals' and outcome:

A total of 54 (56.25%) FN episodes had requirement of anti-fungals and most (70.3 %) of them recovered after 1 week and only few (22.2%) recovered within 1 week. Nearly seven percent (7.4%) of these FN episodes had mortality.p-value came out to be significant (0.001).

Correlation between 'Requirement of anti-virals' and outcome:

Only 1 (1%) FN episode had requirement of anti-virals, and that patient recovered within 1 week. p-value came out to be insignificant (0.493).

Table 36: Correlation between requirement of oxygen, requirement of ventilation, requirement of inotropes, requirement of PICU, need of anti-fungals and need of anti-virals

		Outcome						Total	Chi-square value	p-value
		with in 1 week (n=40)		> 1 week (n=52)		Mortality/DAMA (n=4)				
Requirement of Oxygen		36	90.0%	43	82.69%	0	0.0%	79	20.225	0.001
	y	4	10.0%	9	17.31%	4	100.0%	17		
Requirement of Ventilation		39	97.5%	50	96.15%	0	0.0%	89	53.129	0.001
	y	1	2.5%	2	3.85%	4	100.0%	7		
Requirement of Inotropes		40	100.0%	49	94.23%	0	0.0%	89	54.182	0.001
	y	0	0.0%	3	5.77%	4	100.0%	7		
Requirement of PICU		40	100.0%	49	94.23%	0	0.0%	89	54.182	0.001
	y	0	0.0%	3	5.77%	4	100.0%	7		
Need of Anti-Fungals		28	70.0%	14	26.92%	0	0.0%	42	18.325	0.001
	y	12	30.0%	38	73.08%	4	100.0%	54		
Need of Anti-virals		39	97.5%	52	100.0%	4	100.0%	95	1.415	0.493
	y	1	2.5%	0	0.00%	0	0.0%	1		
Total		40	100.0%	52	100.0%	4	100.0%	96		

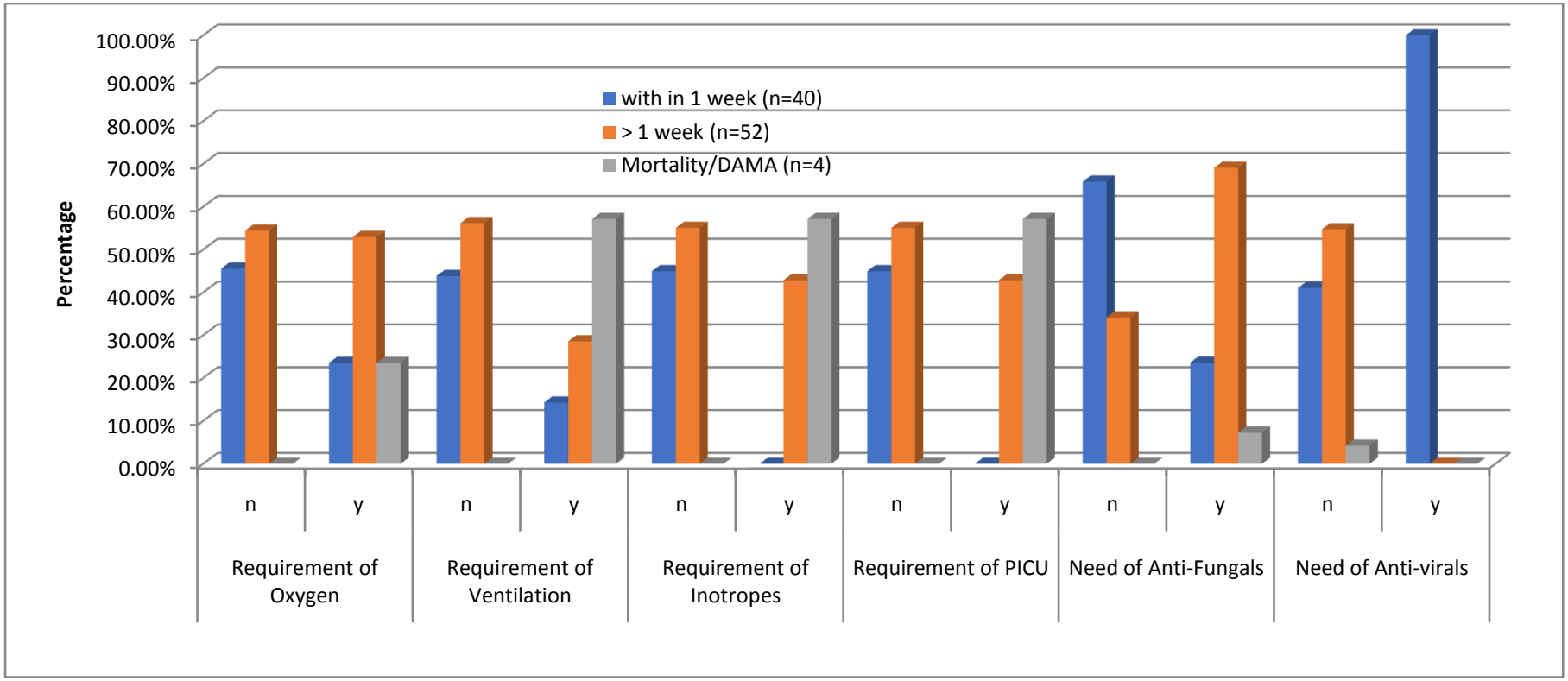


Figure 29: Correlation between requirement of oxygen, requirement of ventilation, requirement of inotropes, requirement of PICU, need of anti-fungals and need of anti-virals

OUTCOME:

Less than half of the FN episodes (40, 41.7%) showed recovery within one week,

Nearly 52 (54.2%) FN episodes showed recovery after one week,

One (1, 1%) FN episode went discharge against medical advise and

Three (3, 3.1%) FN episodes had mortality.

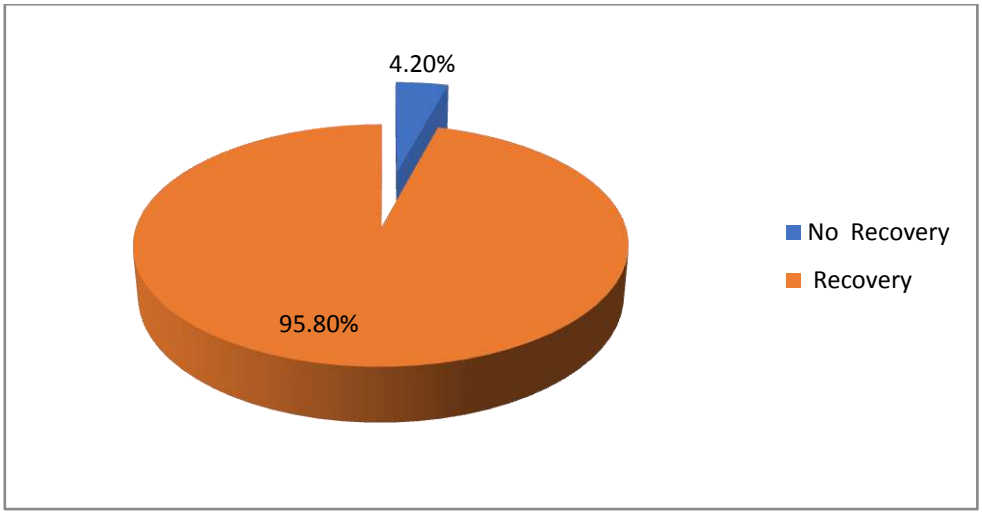


Figure 30: Distribution of recovery-I

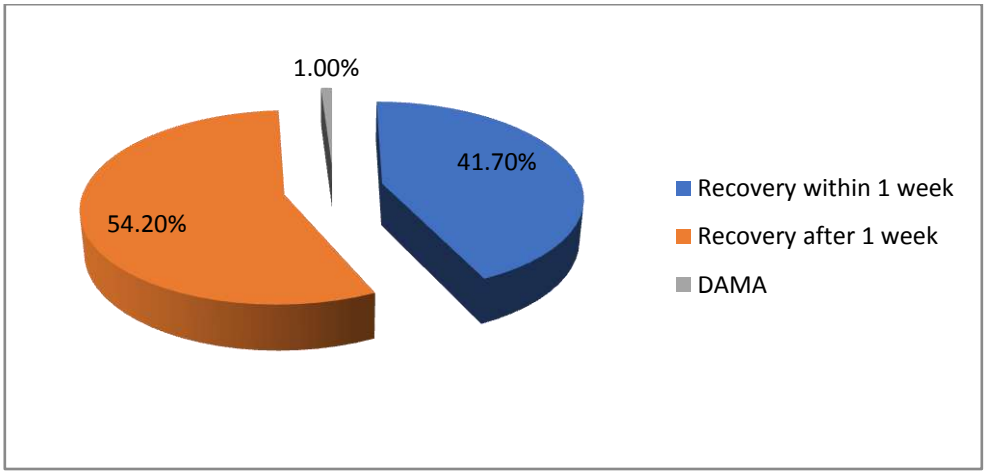


Figure 31: Distribution of recovery-II

DELAY V/S NON-DELAY:

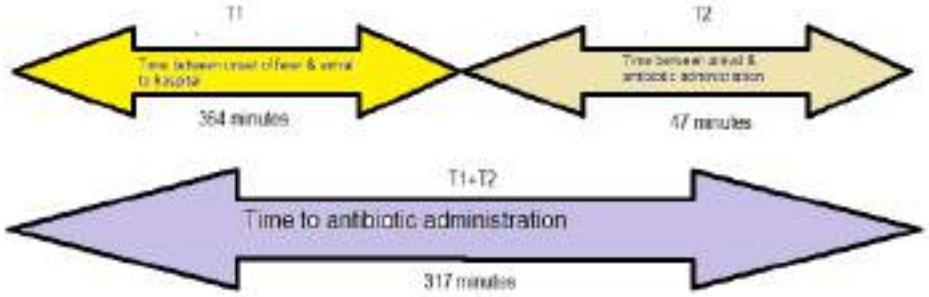


Figure 32: Distribution of time to antibiotic administration

Time between 'onset of fever' and 'arrival to hospital': The time taken to reach hospital after onset of fever was taken as T1.

Time between 'arrival to hospital' and 'antibiotic administration': The time taken to administer antibiotic after reaching hospital was taken as T2.

Time to antibiotic administration: The total time taken from onset of fever to administration of antibiotic was taken as T1+T2.

Time to antibiotic administration:

The average time to antibiotics in 96 episodes of FN was 317 (± 676.6) minutes.

The duration between onset of fever and arrival to hospital in 71 episodes of FN (outpatients) was 364 (± 749.6) minutes. This duration was applicable only for outpatients.

The duration between arrival to hospital and administration of antibiotics was 47 (± 72.7) minutes.

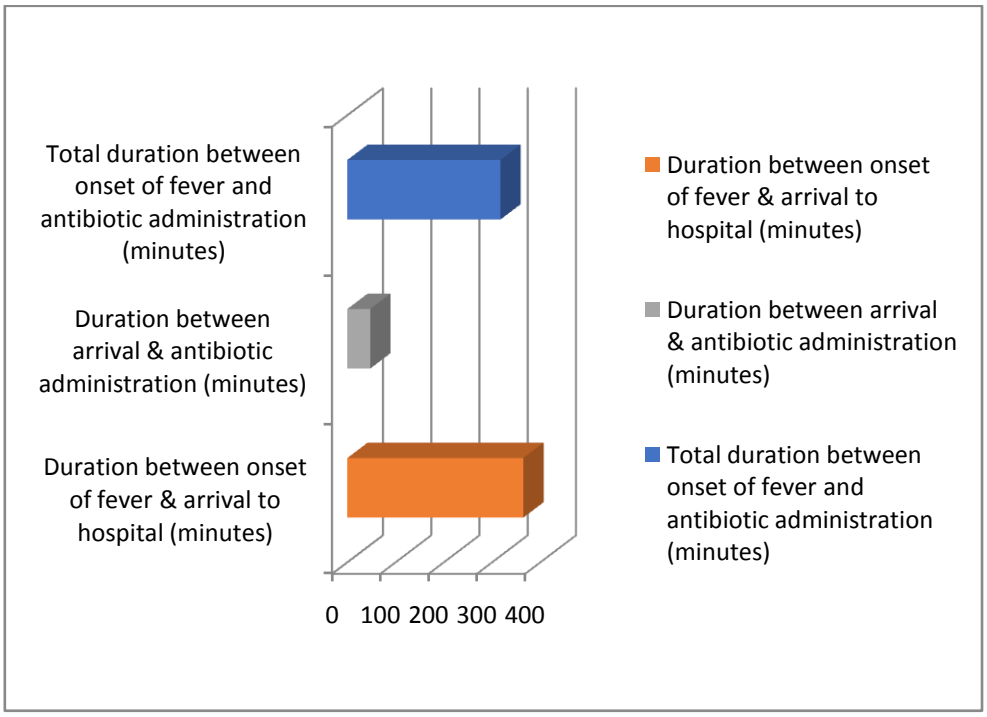

Total duration between onset of fever and antibiotic administration (minutes)
Duration between arrival & antibiotic administration (minutes)
Duration between onset of fever & arrival to hospital (minutes)
0
100
200
300
400
Duration between onset of fever & arrival to hospital (minutes)
Duration between arrival & antibiotic administration (minutes)
Total duration between onset of fever and antibiotic administration (minutes)

Figure 33: Comparison of mean duration between onset of fever & arrival to hospital; between arrival & antibiotic administration and total duration between onset of fever and antibiotic administration

DELAY:

Delay in administration of antibiotics within golden hour was seen in 58 (60.4%) episodes of FN, whereas 38 (39.6%) FN episodes had no delay in receiving antibiotics. Out of 58 FN episodes who had delay in receiving antibiotics, 52 (89.7% of 58, 54.2% of total 96 patients) had delay before arrival to hospital and 6 (10.3% of 58, 6.3% of total 96 patients) had delay after arrival to hospital. p-value came out to be 0.000 (significant).

Table 37.a: Distribution as per delay before arrival to hospital

		Delay				Total		Chi-square value	p-value
		N		y					
Delay before arrival to hospital		38	100.0%	6	10.34%	44	45.8%	74.332	0.000
	Y	0	0.0%	52	89.66%	52	54.2%		
Total		38	100.0%	58	100.0%	96	100.0%		

Table 37.b: Distribution as per delay after arrival to hospital

		Delay				Total		Chi-square value	p-value
		N		y					
Delay after arrival to hospital		38	100.0%	52	89.66%	90	93.8%	4.193	0.078
	Y	0	0.0%	6	10.34%	6	6.3%		
Total		38	100.0%	58	100.0%	96	100.0%		

CAUSE OF DELAY:

Cause of delay was non-availability of transport in 32 (55.17%) episodes, ingestion of NSAIDs at home in 15 (25.86%) episodes, unawareness of situation in 6 (8.62%) episodes and hospital related causes in 6 (10.34%) episodes.

Table 38: Distribution & Comparison as per causes of delay

Cause	Number of cases	Percentage
Cause: Non availability of transport	32	55.17%
Cause: Ingestion of NSAID at home	15	25.86%
Cause: Unawareness of situation	5	8.62%
Cause: Hospital related	6	10.34%
Total	58	100.00%

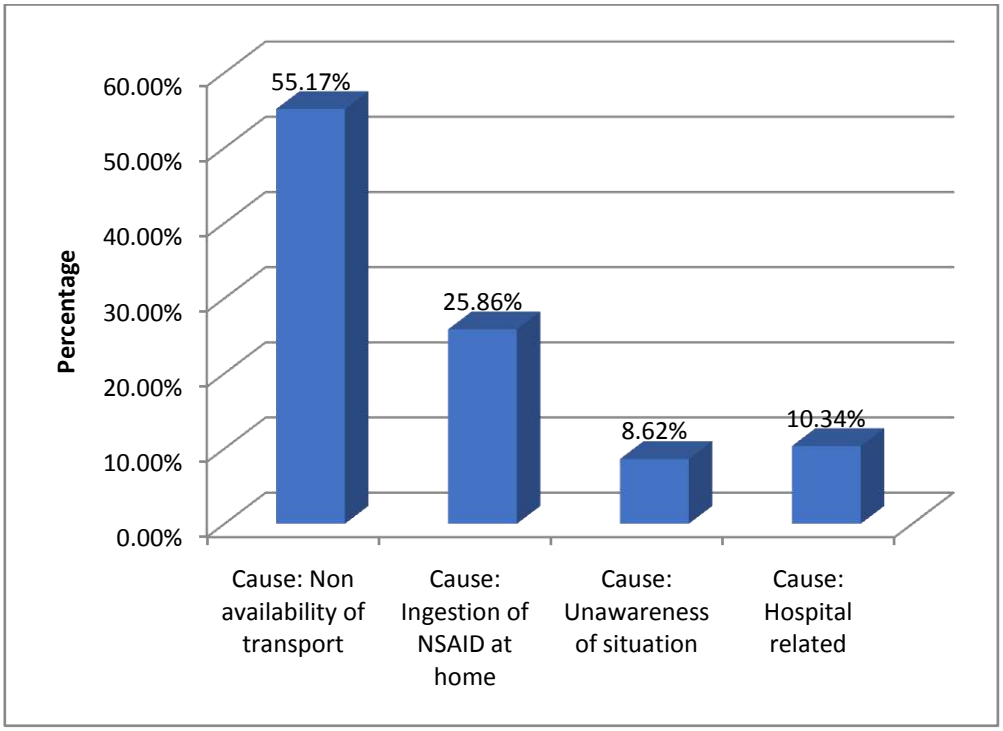


Figure34: Distribution of causes of delay

DELAY V/S NON-DELAY:

FN episodes were divided into two groups: Delay v/s non-delay on the basis of time of receiving antibiotics. Those who received antibiotics within one hour of onset of fever were categorized as Non-Delay group whereas those who received antibiotics after one hour of onset of fever were categorized as Delay group.

Correlation between initial risk stratification scoring in patients with delay v/s non-delay:

Mean risk stratification score was 8.68 (±1.579) in episodes with no delay whereas it was higher in patients with delay (9.03 ± 1.544). p-value came out to be 0.284 (non-significant).

Table 39: Correlation between initial risk stratification scoring in patients with delay v/s non-delay

	Delay	N	Mean	Std. Deviation	Std. Error Mean	T	p-value
Score	n	38	8.68	1.579	.256	-1.077	0.284
	y	58	9.03	1.544	.203		

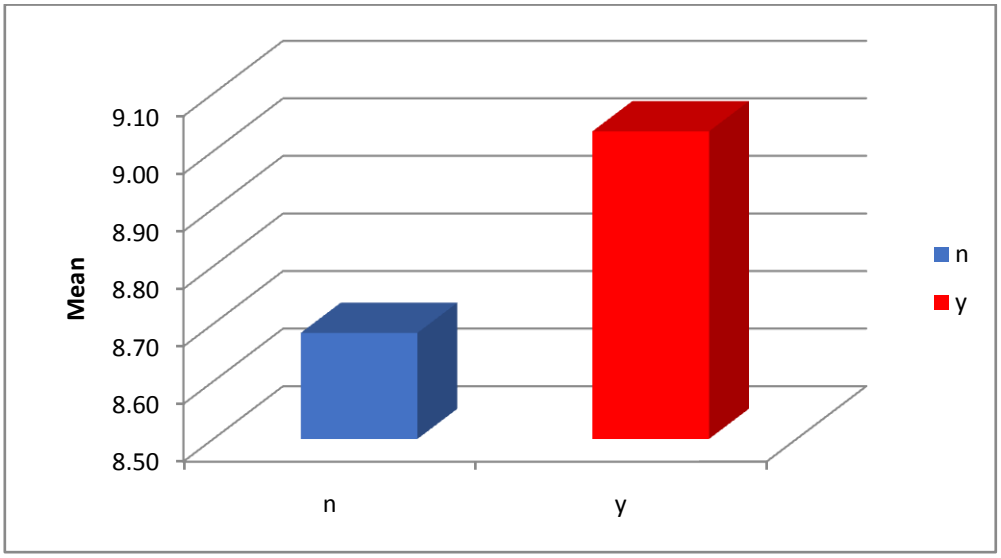


Figure 35: Correlation between initial risk stratification scoring in patients with delay v/s non-delay

CLINICAL FEATURES:

Amongst the episodes who had delay, most common system involved was GIT (26, 44.8%) followed by Respiratory system (11,18.9%), Urinary symptoms (2, 3.40%), Musculo-skeletal symptoms (5, 8.6%).

Amongst the episodes who had no delay, most common system involved was GIT (17, 44.7%) followed by Respiratory system (9, 23.60%), Urinary symptoms (1, 2.60%), CNS symptoms (1, 2.60%) and Musculo-skeletal symptoms (2, 5.2%).

Table 40: Comparison as per system involved in delay v/s non-delay

	No delay	No delay	Delay	Delay	Total	Percentage
GIT symptoms	17	44.7%	26	44.8%	43	44.8%
Respiratory symptoms	9	23.60%	11	18.90%	20	20.80%
Urinary complaints	1	2.60%	2	3.40%	3	3.10%
CNS symptoms	1	2.60%	0	0.00%	1	1.00%
Musculo-skeletal symptoms	2	5.20%	5	8.60%	7	7.30%
Total	38	78.70%	58	75.70%	96	100.00%

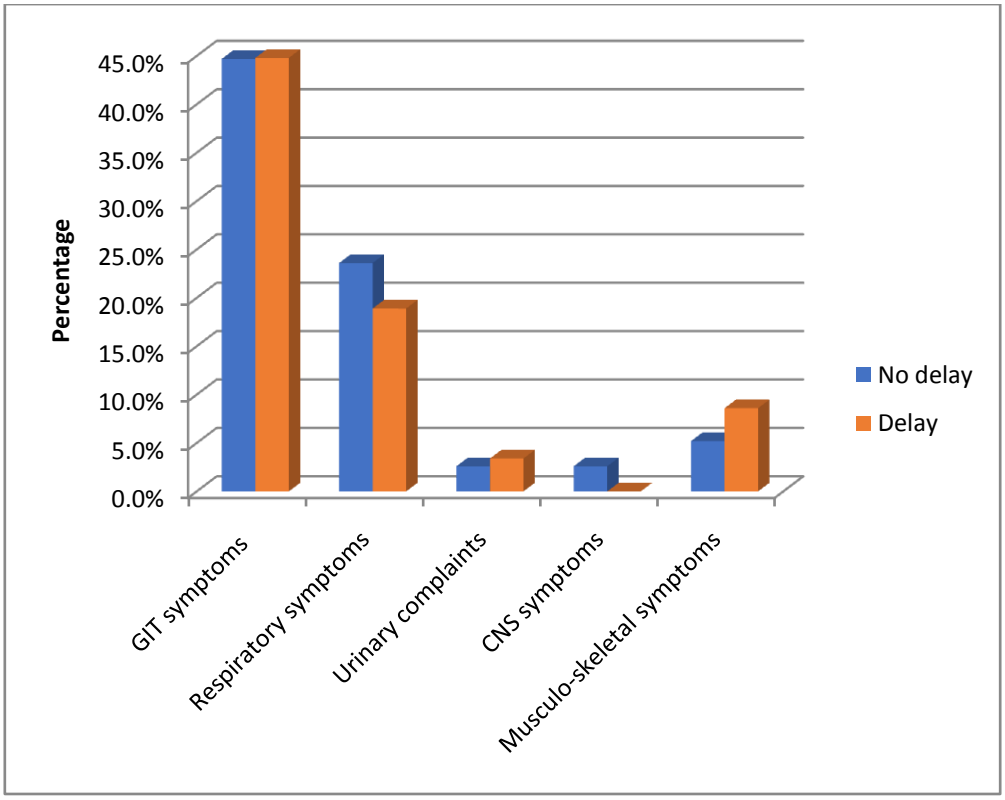


Figure 36: Comparison as per system involved in delay v/s non-delay

Amongst the FN episodes who had delay, most common symptom was diarrhoea (11, 18.90%) followed by pain abdomen (9, 15.50%), cough (8, 13.70%), respiratory distress (6, 10.30%), myalgias (5, 8.60%), UTI (1, 1.70%) and oliguria (1, 1.70%). Amongst the FN episodes who had no delay, most common system involved was cough (8, 21.05%) followed by pain abdomen (6, 15.70%), diarrhoea (4, 10.50%), myalgias (2, 5.20%), respiratory distress (1, 2.60%), UTI (1, 2.60%) and seizures (1, 2.60%).

Table 41: Comparison as per presenting symptoms in delay v/s non-delay

	No delay	No delay	Delay	Delay	Total	Percentage
Pain abdomen	6	15.70%	9	15.50%	15	15.60%
Diarrhoea	4	10.50%	11	18.90%	20	20.80%
Cough	8	21.05%	8	13.70%	16	16.70%
Respiratory distress	1	2.60%	6	10.30%	7	7.30%
UTI	1	2.60%	1	1.70%	2	2.10%
Oliguria/anuria	0	0.00%	1	1.70%	1	1.00%
Seizures during hospital stay	1	2.60%	0	0.00%	1	1.00%
Myalgias	2	5.20%	5	8.60%	7	7.30%
Total	38	62.85%	58	70.40%	96	100.00%

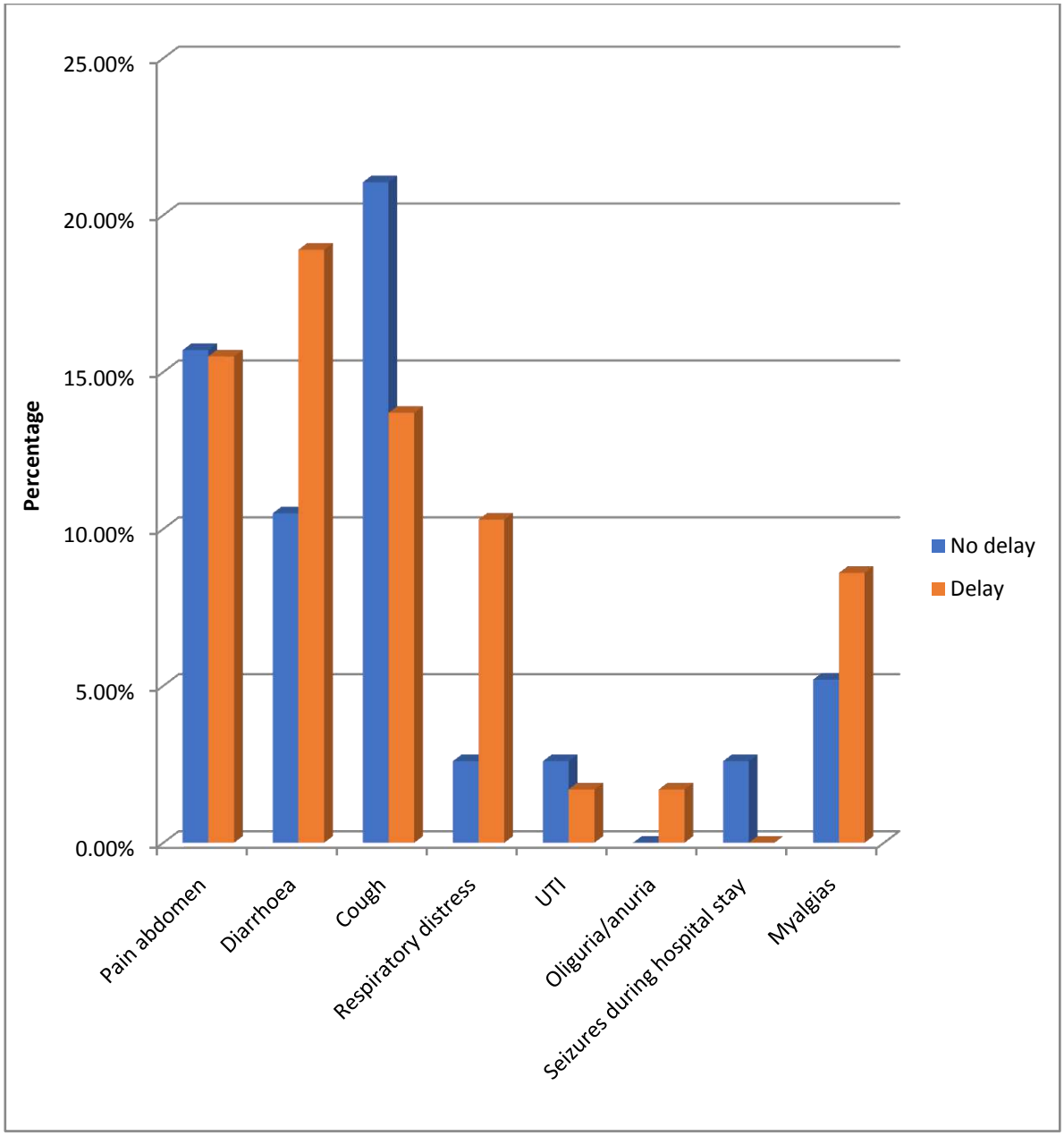


Figure 37: Comparison as per presenting symptoms in delay v/s non-delay

VITALS:

Amongst the FN episodes who had delay, 14 (24.10%) had tachycardia, 12 (20.60%) had tachypnea, 9 (15.50%) had hypotension, 5 (8.60%) had de-saturation and 2 (3.40%) had prolonged CFT.

Amongst the FN episodes who had no delay, 8 (21.05%) had tachycardia, 7 (18.40%) had tachypnea, 3 (7.80%) had hypotension, 3 (7.80%) had de-saturation and 3 (7.80%) had prolonged CFT.

Table 42: Comparison as per vitals in delay v/s non-delay

	No delay	No delay	Delay	Delay	Total	Percentage
Tachycardia	8	21.05%	14	24.10%	22	22.90%
Tachypnea	7	18.40%	12	20.60%	19	19.80%
Hypotension	3	7.80%	9	15.50%	12	12.50%
De-saturation	3	7.80%	5	8.60%	8	8.30%
Prolonged CFT (>2sec)	3	7.80%	2	3.40%	5	5.20%
Total	38	62.85%	58	72.20%	96	100.00%

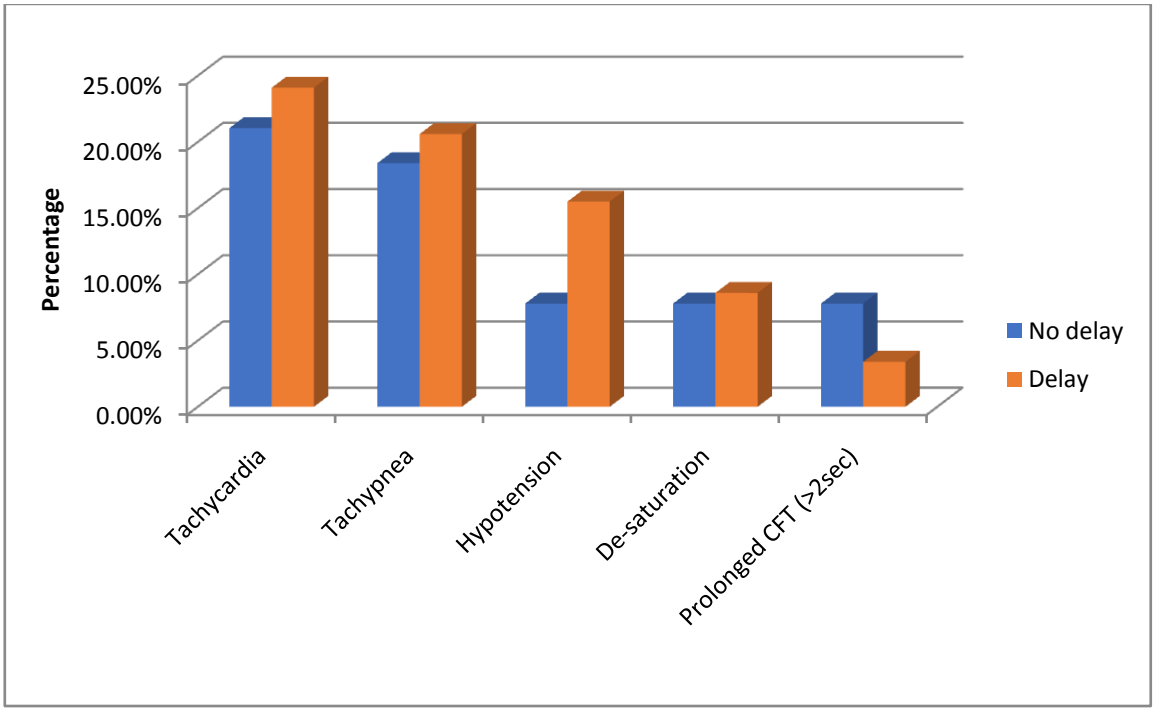


Figure 38: Comparison as per vitals in delay v/s non-delay

OUTCOME:

TIME TO DEFERVESCENCE OF FEVER:

The FN episodes who had delay in receiving antibiotics had a longer time to defervescence of fever (7.67 ± 3.817 days) than those who had no delay in receiving antibiotics (5.50 ± 3.875 days).

Table 43: Comparison of time taken to defervescence of fever in delay v/s non-delay

Delay	n		y		Z	p-value
	Mean	SD	Mean	SD		
Time to defervescence (days)	5.50	3.875	7.67	3.817	-2.664	0.009

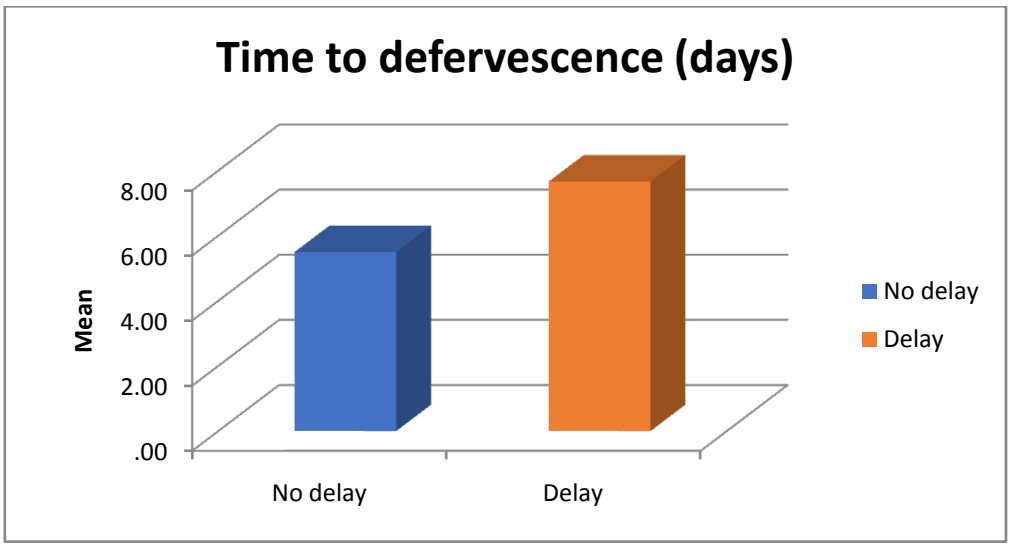


Figure 39: Comparison of time taken to defervescence of fever in delay v/s non-delay

DURATION OF NEUTROPENIA:

The mean duration of neutropenia was longer in episodes having delay than those with no delay (6.31 days v/s 5.71 days).

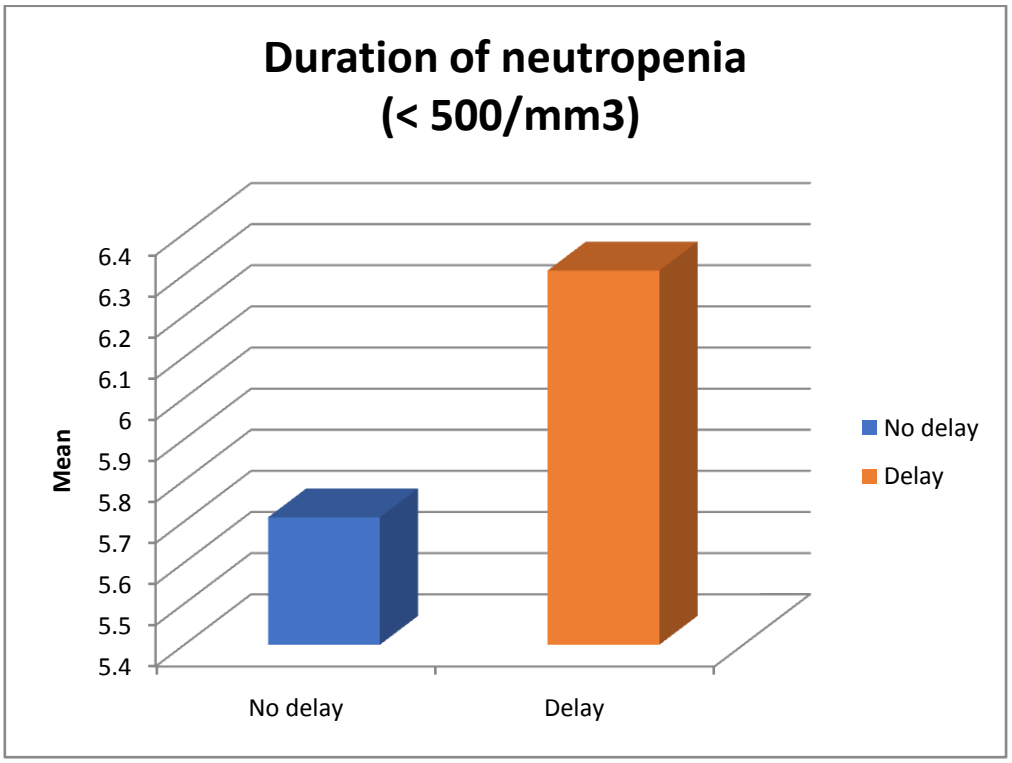


Figure 40: Comparison of duration of neutropenia between delay and non-delay

REQUIREMENT OF OXYGEN, REQUIREMENT OF PICU, REQUIREMENT OF VENTILATION, REQUIREMENT OF INVASIVE VENTILATION, REQUIREMENT OF INOTROPES, REQUIREMENT OF BLOOD PRODUCTS:

Amongst the FN episodes who had delay, one-fourth (14, 24.14%) required oxygen whereas only 3 (7.89%) episodes with no delay required oxygen. p-value came out to be 0.056 (non-significant).

Amongst the FN episodes who had delay, 5 (8.62%) required transfer to PICU whereas only 2 (5.26%) episodes required transfer to PICU amongst non-delay group. p-value came out to be 0.536 (non-significant).

Amongst the FN episodes who had delay, 6 (10.34%) required ventilation (non-invasive) whereas only 1 (2.63%) episode required non-invasive ventilation amongst non-delay group. p-value came out to be 0.155 (non-significant).

Amongst the FN episodes who had delay, 3 (5.17%) required invasive ventilation whereas only 1 (2.63%) episode required invasive ventilation amongst non-delay group. p-value came out to be 0.542 (non-significant). Amongst the FN episodes who had delay, 7 (7.3%) required inotropes whereas only 2 (5.26%) episodes required inotropes amongst non-delay group. p-value came out to be 0.536 (non-significant).

Amongst the FN episodes who had delay, 41 (70.69%) required blood products whereas only 24 (63.16%) required blood products amongst the non-delay group. p-value came out to be 0.506 (non-significant).

Table 44: Comparison as per need of anti-fungals/anti-virals/oxygen/ventilation/inotropes/ PICU/ blood products in delay v/s non-delay

	No delay	No delay	Delay	Delay	Total	Percentage	Chi-square value	p-value
Need of anti-fungals	19	39.60%	35	64.81%	54	56.25%	0.998	0.318
Need of anti-virals	1	100.00%	0	0.00%	1	1.00%	1.542	0.214
Requirement of oxygen	3	17.60%	14	82.40%	17	17.70%	4.157	0.056
Requirement of ventilation	1	14.30%	6	85.70%	7	7.30%	2.021	0.155
Requirement of inotropes	2	28.60%	5	71.40%	7	7.30%	0.383	0.536
Requirement of PICU	2	28.60%	5	71.40%	7	7.30%	0.383	0.536
Requirement of blood products	24	36.90%	41	63.10%	65	67.70%	0.596	0.506
Total	38	39.60%	58	60.40%	96	100.00%		

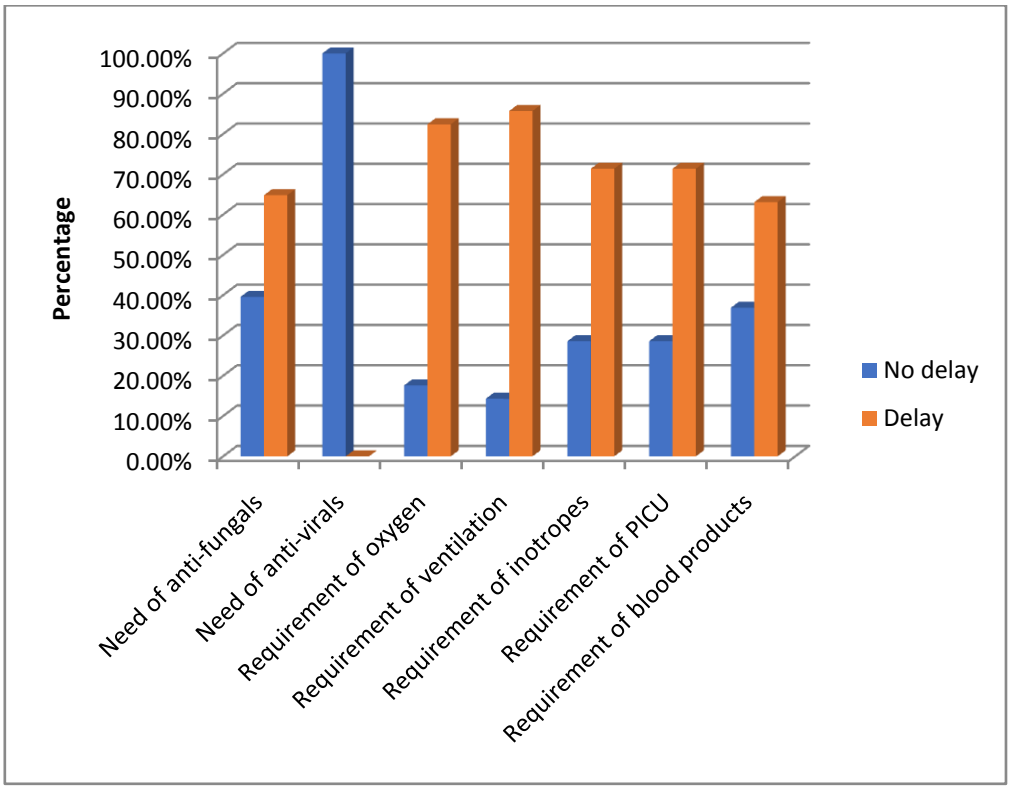


Figure 41: Comparison as per need of anti-fungals/anti-virals/oxygen/ventilation/inotropes/ PICU/ blood products in delay v/s non-delay

DURATION OF ANTIBIOTICS, DURATION OF PICU STAY, DURATION OF INOTROPES, DURATION OF HOSPITAL STAY (DAYS), NUMBER OF PACKED CELL & RDP TRANSFUSED:

The mean duration of antibiotics (days) in FN episodes with no delay was 7.11 (±3.71) and 9.26 (±4.27) inepisodes with delay. p-value came out to be 0.013 (significant).

The mean duration of PICU stay (days) in FN episodes with no delay was 6.00 (±5.66) and 4.00(±2.12) inthose with delay. p-value came out to be 0.484 (non-significant).

The mean duration of inotropes (days) in FN episodes with no delay was 4.50 (±3.54) and 3.20(±1.79) inthose with delay. p-value came out to be 0.520 (non-significant).

The mean duration of hospital stay (days) in FN episodes with no delay was 8.29(±4.23) and 10.34 (±4.53) in those with delay. p-value came out to be 0.028 (non-significant).

The mean number of Packed cell transfused in FN episodes with no delay was 1.18 (±0.39) and 1.39(±0.89) in those with delay. p-value came out to be 0.292 (non-significant).

The mean number of RDP transfused in FN episodes with no delay was 1.50 (±0.65) and 2.38(±2.60) in those with delay. p-value came out to be 0.222 (non-significant).

Table 45: Comparison as per duration of antibiotics, duration of inotropes, duration of PICU stay, duration of hospital stay, number of Packed cell and RDP transfused in delay v/s non-delay

Delay	n		y		Z	p-value
	Mean	SD	Mean	SD		
Duration of antibiotics (days)	7.11	3.71	9.26	4.27	-2.540	0.013
Duration of inotropes (days)	4.50	3.54	3.20	1.79	0.691	0.520
Duration of PICU stay (days)	6.00	5.66	4.00	2.12	0.756	0.484
Duration of hospital stay (days)	8.29	4.23	10.34	4.53	-2.231	0.028
No. of Packed cell (PC) transfused	1.18	0.39	1.39	0.89	-1.064	0.292
No. of RDP transfused	1.50	0.65	2.38	2.60	-1.241	0.222

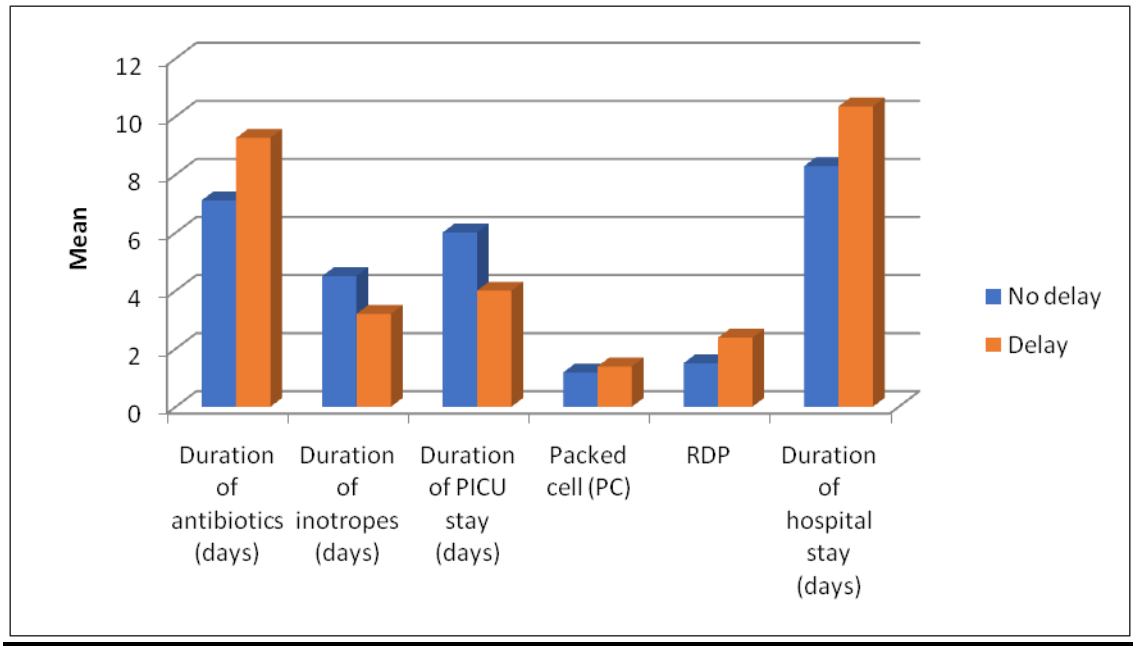


Figure 42: Comparison as per duration of antibiotics, duration of inotropes, duration of PICU stay, duration of hospital stay, number of Packed cell and RDP transfused in delay v/s non-delay

OUTCOME:

Amongst the FN episodes who had delay, 18 (31.3%) recovered within 1 week whereas 22 (57.89%) recovered within 1 week amongst the non-delay group. p-value came out to be 0.011 (significant).

Amongst the FN episodes who had delay, 36 (62.07%) recovered after 1 week whereas 16 (42.11%) recovered after 1 week amongst the non-delay group. p-value came out to be 0.055 (non-significant).

Amongst the FN episodes who had delay, 1 (1.72%) went DAMA whereas none (0%) went DAMA amongst the non-delay group. p-value came out to be 0.416 (non-significant).

Amongst the FN episodes who had delay, 3 (5.17%) had mortality whereas none (0%) had mortality amongst the non-delay group. p-value came out to be 0.154 (non-significant).

Table 46.a: Distribution & Comparison as per outcome

		Delay				Total		Chi-square value	p-value
		N		Y					
OUTCOME		0	0.0%	4	6.90%	4	4.2%	2.735	0.150
Recovery	Y	38	100.00%	54	93.10%	92	95.8%		
Total		38	100.00%	58	100.00%	96	100.0%		

Table 46.b: Distribution & Comparison as per outcome

		Delay				Total		Chi-square value	p-value
		N		Y					
Recovery within 1 week	Y	22	55.0%	18	45.0%	40	41.7%	6.815	0.011
Recovery after 1 week	Y	16	30.8%	36	69.2%	52	54.2%	3.686	0.055
DAMA	Y	0	0.0%	1	100.0%	1	1.0%	0.662	0.416
Mortality	y	0	0.0%	3	100.0%	3	3.1%	2.029	0.154
Total		38	39.6%	58	60.4%	96	100.0%		

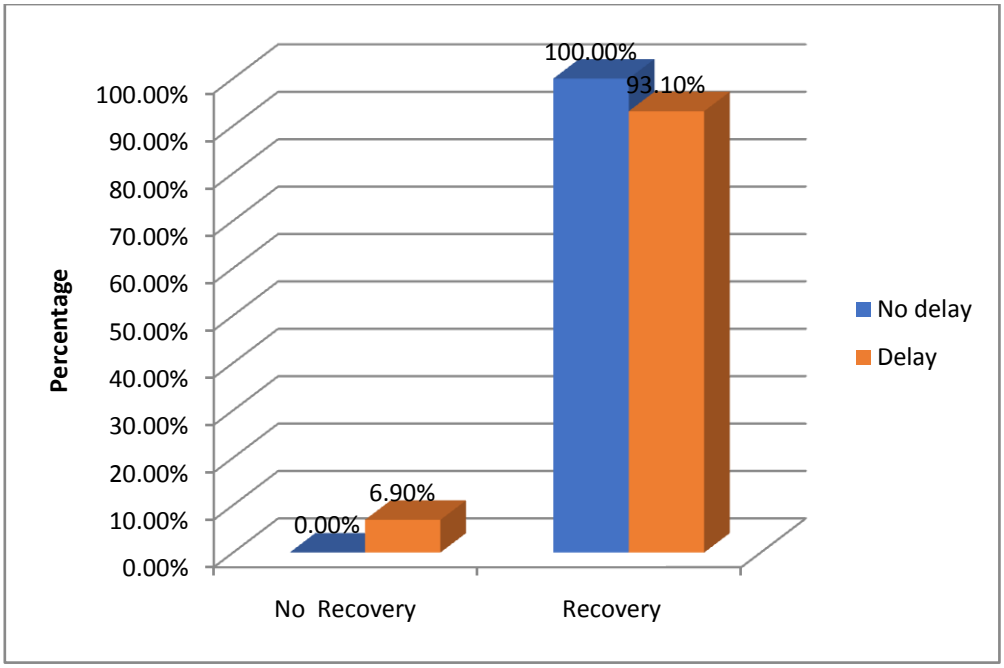


Figure 43: Distribution & Comparison as per outcome-I

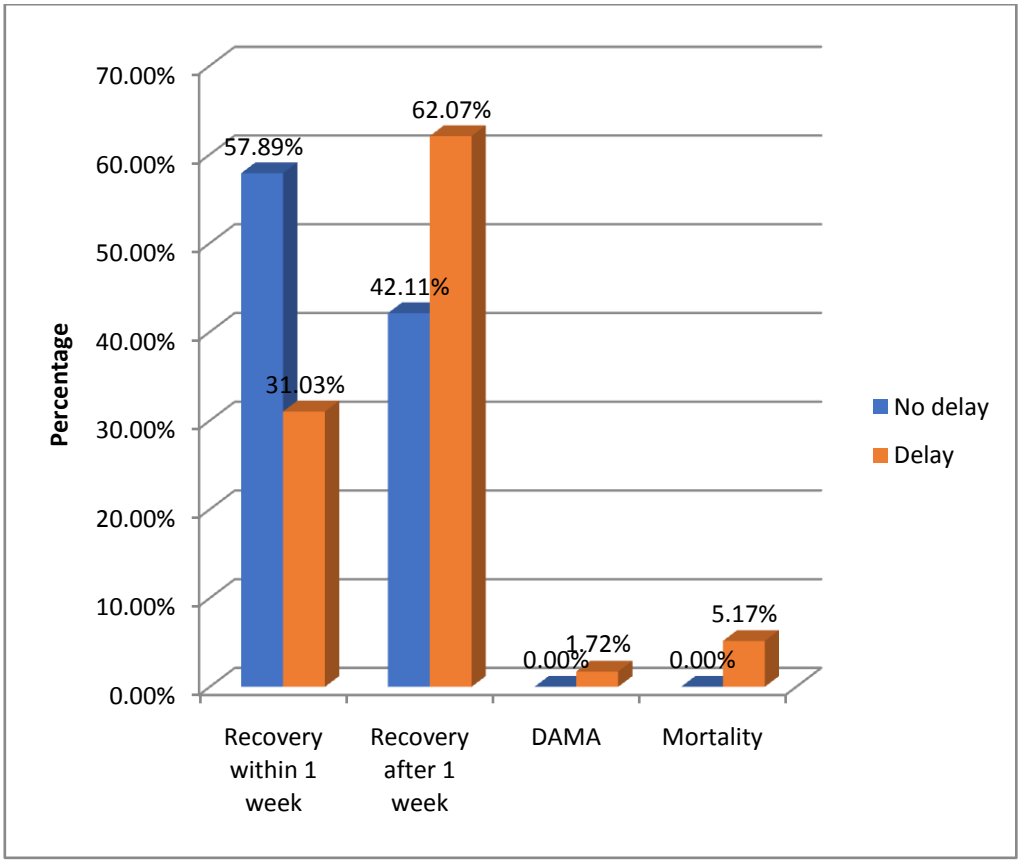


Figure 44: Distribution & Comparison as per outcome-II

DISCUSSION

During the study period (from 1st March 2021 to 31st May 2022), a total of 2010 patients were admitted in Paediatric Oncology Unit. Amongst these, 1284 patients were admitted for administration of chemotherapy, 312 patients were admitted for transfusion of blood products and 414 patients were admitted with fever. Ninety-six (96) episodes of FN in 71 patients were categorized as high risk. The remaining low risk patients were excluded from the study.

BASELINE DATA INCLUDING DEMOGRAPHICS, ANTHROPOMETRY AND DETAILS OF ONGOING CHEMOTHERAPY:

Age group, Gender:

The mean age of patients in the study was 7.62 (± 4.88) years.Maximum number of children (38%) were in the age group of <5 years, followed by 5-10 years and >10 years. The male:female ratio was 3.17:1.

The other studies of febrile neutropenia in children from India also showed a similar age and gender distribution.Results comparable to our study were seen in a study conducted by P Dhanaleha et al.[137] who had a mean age of 4-6 years with male: female ratio of 1.6:1 and 20.5% children in the age group of 1-3 years, 34.8% in the age group of 4-6 years, 31.3% in the age group of 7-9 years and 13.4% in the age group of 10-12 years.Similar results were seen in a study conducted by Anirban Das et al[62] in whose study, the median age was 5 years and male: female ratio was 3:1. A study was conducted by Rajan Kapoor et al.[138] in children aged < 12 years comprising 62% males and 38% females. Similar results were seen in a study conducted by Chaudhuri et al.[117] in children aged between 2 to 12 years, with mean age of 6.021 (±2.705) years and comprising 43% males and 56% females.In the study conducted by Sapna Oberoi et al.[64] the median age was 5 years and 71% were males and 29% were females.A study conducted by Namrata Todurkar et al.[131] had mean age of 6 years with 73% male population and 27% female population.

Anthropometry:

Malnutrition is extremely common in patients with haematological malignancies with estimated incidence varying from 6%-50%.[113] In previous studies from the Indian

subcontinent and sub-Saharan Africa [112], undernutrition has been documented in 30–70% of the cases and has contributed to infection-related complications and mortality. Malnourished children have reduced leukocyte function and an altered cytokine profile, predisposing them to infections. [117]

In our study, malnutrition was present in 15.5% of patients and 11.3% patients were over-weight /obese.Most of the children fell between 3rd-97th centile of weight, height and BMI.

Similar results as our study were seen in a study conducted by Anirban Das et al.[62] who found undernutrition in 70 (17%) episodes of febrile neutropenia.In a study conducted by Chaudhuri et al.[117]in West Bengal on 48 participants, 30 (62.5%) had malnutrition, a percentage higher than our study, which could be due to higher overall percentage of wasted children in West Bengal compared to Punjab (20.3% v/s 10.6% as per NFHS 5).

Diagnosis:

The commonest underlying malignancy in our cohort was ALL (59.3%) followed by AML(11.5%), Ewing sarcoma (10.4%), Osteosarcoma (7.3%), Burkitt lymphoma (3.1%), Hodgkin lymphoma (2.1%) and ALL Relapse (2.1%).

Other authors have also reported ALL as the commonest underlying malignancy in patients with febrile neutropenia, constituting nearly 70%-90%.The studiesby Rajan Kapoor et al.[138], Chaudhuri et al.[117], Anirban Das et al. [62] and Namrata Todurkar et al.[131] also had highest proportion of malignancy as ALL (92% , 91.6%, 74.2% and 70% respectively).A study was conducted by Kalpathi Krishnamani et al. [121] in which hematologic malignancies accounted for 299 (89.7%) episodes. Acute myeloid leukemia (AML), acute lymphoblastic leukemia (ALL), acute promyelocytic leukemia, Ewing's sarcoma and Diffuse large B cell lymphoma accounted for 129 (38.3%), 117 (35.1%), 36 (10.8%), 14 (4%) and 7 (2%) patients respectively.

Phase of Chemotherapy, Days since last chemotherapy, Presentation of patient, Time since last discharge:

Majority of the febrile neutropenia episodes were undergoing Intensive phase of chemotherapy (80.2%) and remaining (19.8%) were undergoing maintenance phase of chemotherapy. Most of the FN episodes (59.4%) had received chemotherapy within 7 days prior to onset of fever and 40.6% episodes had received chemotherapy

more than 7 days prior to onset of fever. Fever occurred at home in 77 (80.2%) FN episodes [outpatients] and in the hospital in 19 (19.8%) [inpatients]. Nearly three-fourth (71, 74%) of outpatients presented after >72 hours of discharge and 6 (6.3%) presented within 72 hours of discharge from hospital.

In study conducted by Sapna Oberoi et al. [64] 14% of the episodes were in induction phase of chemotherapy, 11% in consolidation phase, 30% in intensification phase and 45% in maintenance phase of chemotherapy.Nearly equalnumber of patients were seen in induction (26%) as well as maintenance phase (25%) in a study conducted by Namrata Todurkar et al.[131]A study conducted by Anirban Das et al.[62] used a risk based score comprising time from last chemotherapy (<7 days- 2 points) to stratify patients into low risk (50.2%) and high risk (49.8%). About 34% (141 episodes of 414) episodes of febrile neutropenia had received chemotherapy within 7 days prior to onset of fever.

CLINICAL FEATURES:

At the time of admission, patients were evaluated for focus of infection. In our study, nearly one-third FN episodes (43, 44.8%) had Gastro-intestinal symptoms, predominant being diarrhoea seen in 20.8% patients followed by pain abdomen in 15.6%. Nearly a quarter of FN episodes (25, 26%) had mucositis at admission and the grade of mucositis was 1, 2, 3 in 4.2%, 16.7% and 5.2% patients respectively. At the time of admission, patients were evaluated for any peri-anal involvement in the form of pain/fissure/abscess and it was found that 3 (3.1%) episodes had peri-anal involvement.

In a similar study conducted byP Dhanaleha et al.[137]on clinical profile of patients with FN, Gastro-intestinal symptoms were seen in the form of vomiting (43%), abdominal pain (8%), diarrhoea (5%) and mucositis (23%).In a study conducted by Rajan Kapoor et al.[138], 8% patients had nausea, vomiting, diarrhoea and pain abdomen, a proportion significantly lower than in our study (36.4%). Namrata Todurkar et al.[131]in their study found GI involvement in 10% episodes.Neutropenic enterocolitis was seen in 22 episodes (5.3%) in a study done by Anirban Das et al. [62]Tsuji et al. [139] in their study concluded that significant higher incidence of systemic infectious and/or inflammatory parameters was seen in patients with oral foci of infections, particularly during the first cycle of chemotherapy inducing profound myelosuppression.Akintoye et al.[140] found in their study that 23 out of 49

positive blood cultures with microorganisms were likely to originate from the oral cavity.A study done by B. Morcos et al.[141] found that 101 (10.8%) had perianal complaints or conditions. Most of them were non septic (74.3%), like piles and fissures, and were treated conservatively. In 26 patients the diagnosis was a septic condition: abscess (12 patients), fistula (4), inflammation (9) and necrotizing fasciitis (1).

In our study, about one-fifth of FN episodes (20, 20.8%) had respiratory symptoms, predominant being cough in 16.7% patients followed by respiratory distress in 7.3% patients. In a similar study conducted byP Dhanaleha et al.[137] , respiratory symptoms were seen in the form of dyspnea (34%) and cough (29%).In a study conducted by Rajan Kapoor et al.[138] , 32% had respiratory symptoms in the form of cough, runny nose, sore throat, breathlessness and pleuritic chest pain, a proportion higher than in our study.In a study conducted by Chaudhuri et al.[117] , respiratory system involvement was seen in 11.72% patients.Namrata Todurkar et al.[131]in their study found URI/LRI involvement in 2% episodes.

Only 3 (3.1%) FN episodes had urinary complaints, in the form of symptoms of UTI in 2.1% followed by oliguria in 1% in our study. In a similar study conducted byP Dhanaleha et al.[137], urinary complaints in the form of dysuria was seen in 25% patients.Urinary tract infections (UTI) are among the most prevalent bacterial infections in pediatric oncology patients. [142,143,144]Acute renal failure was seen in 19 (4.5%) episodes of FN in a study done by Anirban Das et al. [62]

Only 1 (1%) had CNS symptoms in the form of seizure during hospital stay in our study. In a similar study conducted by P Dhanaleha et al.[137]CNS symptoms in the form of seizures and headache were seen in 2% and 1% respectively.

Musculo-skeletal symptoms were seen in 7 (7.3%) episodes in the form of myalgias in our study.Namrata Todurkar et al.[131] in their study found soft tissue involvement in 6% episodes.

Table 47: Comparison of distribution of system & symptoms in various studies:

SYSTEM & SYMPTOMS	P.Dhanaleha et al.[137](2013)	Rajan Kapoor et al. [138](2018)	Namrata Todurkar et al. [131] (2019)	Anirban Das et al.[62] (2014)	Chaudhuri et al.[117] (2016)	Our study
Gastro-intestinal system	-	8%	10%	-	-	44.8%
Vomiting	43%	-	-	-	-	-
Abdominal pain	8%	-	-	-	-	15.6%
Diarrhoea	5%	-	-	-	-	20.8%
Mucositis	23%	-	-	-	-	26%
Peri-anal involvement	-	-	-	-	-	3.1%
Neutropenic enterocolitis	-	-	-	5.3%	-	-
Respiratory system	-	32%	2-%	-	11.72%	20.8%
Cough	29%	-	-	-	-	16.7%
Dyspnea	34%	-	-	-	-	7.3%
Urinary system	-	-	-	-	-	3.1%
Dysuria	25%	-	-	-	-	2.1%
Oliguria/Anuria	-	-	-	4.5%	-	1%
CNS system	-	-	-	-	-	1%
Seizure	2%	-	-	-	-	1%
Headache	1%	-	-	-	-	-
Musculo-skeletal symptom	-	-	6%	-	-	-
Myalgias	-	-	-	-		1%

RISK STRATIFICATION SCORE:

In our study, it was found that FN episodes who recovered within 1 week had lower mean risk stratification score [8.45 (±1.38)] than those who recovered after 1 week [9.12 (±1.62)] and those who expired had still higher risk stratification score [10.50 (±1.00)]. p-value came out to be 0.013 (significant).

A study conducted by M.E. Santolaya et al.[51] on risk prediction model for invasive bacterial infection (IBI) was prospectively evaluated among oncology children presenting with fever and neutropenia.[51] The study included assessment of 5 previously identified risk factors: C-reactive protein (CRP) > 90 mg/L, hypotension, relapse of leukemia, platelet count of <50,000 platelets/mm3 , and recent receipt of chemotherapy. Children were classified as having high or low risk for IBI according to a model that considered the number and type of variables present. The study could thus co-relate poor outcomes with higher scores.

Different studies used different risk stratification scores to categorise episodes into low risk and high risk FN:

Table 48: Comparison of percentage of high risk FN in different studies

Studies	Percentage of High risk FN
Santolaya et al.[51]	60.4
Ammann et al.[52]	96.1
Rondinelli et al.[60]	4.6
Hakim et al.[9]	31.9
Agyeman et al.[29]	97.3
Our study	23.1

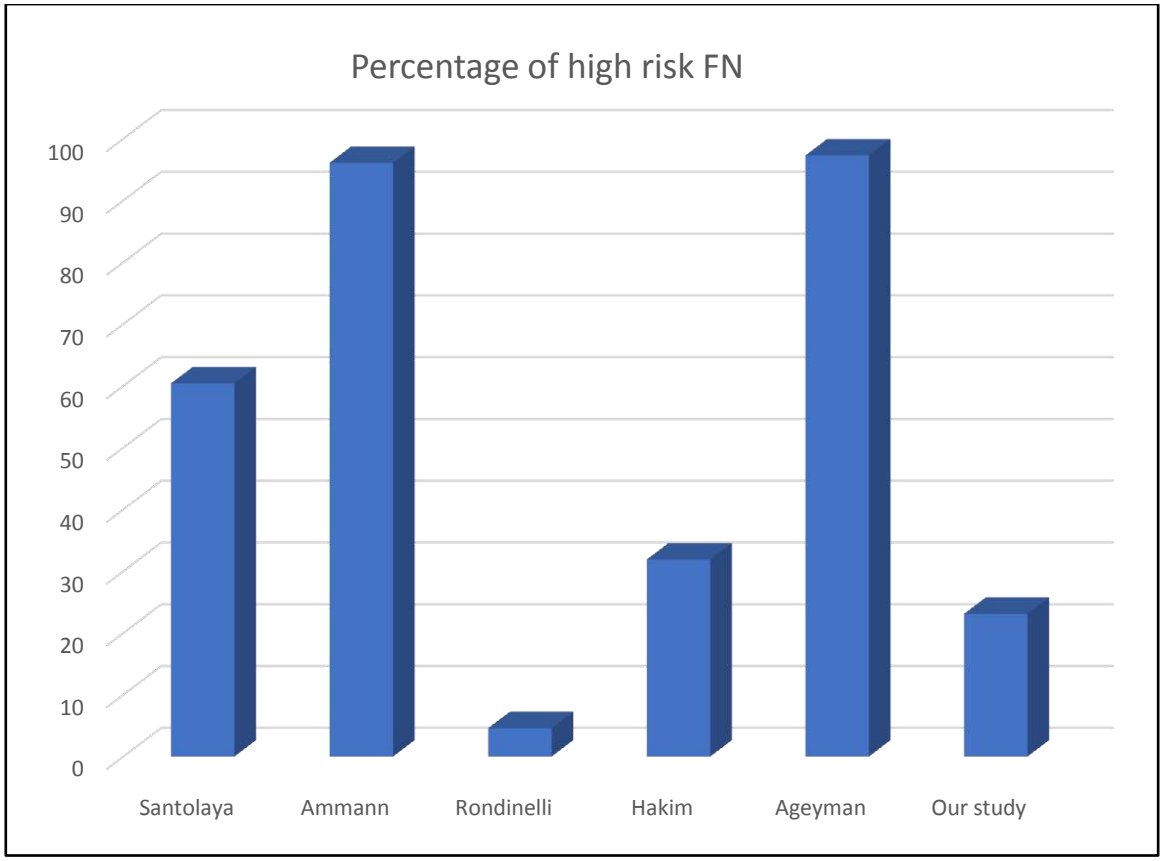


Figure 45: Comparison of percentage of high risk FN in different studies

VITALS:

Tachycardia, Tachypnea, Hypotension, Desaturation, Prolonged CFT:

About a quarter of FN episodes (22, 22.9%) had tachycardia; 13 (13.5%) had tachycardia at presentation and 9 (9.4%) had tachycardia during hospital stay.Nearly one-fifth FN episodes (19, 19.8%) had tachypnea; 8 (8.3%) had tachypnea at presentation and 11 (11.5%) had tachypnea during hospital stay. Twelve (12, 12.5%) had hypotension; 6 (6.3%) had hypotension at presentation and 6 (6.3%) developed hypotension during hospital stay.Less than 10 percent (8, 8.3%) had desaturation; 3 (3.1%) had desaturation at presentation and 5 (5.2%) had desaturation during hospital stay. Five (5, 5.2%) had prolonged CFT; 3 (3.1%) had prolonged CFT at presentation and 2 (2.1%) had prolonged CFT during hospital stay.

Roberto L. Parodl et al.[145]had shown that the presence of dehydration and tachycardia at the onset of febrile neutropenia were significantly associated with mortality.

In a study conducted by P Dhanaleha et al.[137] , respiratory symptoms were seen in the form of dyspnea (34%).A study conducted by Maria E. Santolaya et al [132] found that most of the children who had mortalities were admitted with relapse of ALL (36%), hypotension (71%), and a diagnosis of sepsis (79%), compared with surviving children (16%, 20%, and 5% respectively, P < 0.001).In cases with severe sepsis, each hour of delay in antibiotic administration over the ensuing 6 hours of onset of hypotension has been found to be associated with an average decrease in survival of 7.6%.[68]

INVESTIGATIONS:

Hemogram:

The mean TLC at admission was 1.25 x 10^3/uL(± 2.04), mean ANC was 502 per mm^3(±1305), meanPlatelet count were 104.72 x 10^3/uL (±113.73) and mean Hb was 8.86 gm/dl (±1.90). The meanPCT at admission was 3.75 ng/ml (±12.66) and mean CRP was 45.67 mg/lt (±57.53). The mean albumin at admission was 3.89 g/dl(±0.52).In our study, it was found that FN episodes who recovered within 1 week had higher TLC (1.52 ± 2.28) than those who recovered after 1 week (1.13 ± 1.90) or had mortality (0.15 ± 0.06).It was seen that FN episodes who recovered within 1 week had higher neutrophil count (29.10 ± 25.44) than those who recovered after 1 week (21.25 ± 25.51) or had mortality (3.75 ± 5.50).We found that FN episodes who recovered within 1 week had higher ANC (575.70 ± 1285.25) than those who recovered after 1 week (485 ± 1373.52) or had mortality (7.00 ± 11.34).Profound neutropenia (ANC < 100 /mm^3) was seen in 49 (51.04%) episodes. A higher number of febrile neutropenia episodes with profound neutropenia recovered after 1 week (29, 55.77%) and fewer recovered within 1 week (16, 40.0%). It was seen that all the episodes of FN who had mortality had profound neutropenia at presentation to hospital. p-value came out to be 0.044 (significant). The mean duration of neutropenia was 6.07 days (±3.01). In our study, it was found that FN episodes who recovered within 1 week had higher platelet count (124.98 ± 106.65) than those who recovered after 1 week (96.21 ± 119.72) or had mortality (12.75 ± 7.72).

A study conducted by Gerald P. et al[146] found that when both granulocytopenia and lymphopenia were present, the incidence of severe infection was highest. When granulocytopenia was present alone, the incidence of severe infection was greater

than when lymphopenia was present alone. They also found that when granulocytopenia was already present, any further reduction in the granulocyte count resulted in a 28% incidence of infection. If the granulocyte count was greater than 1,000/mm^3 at the beginning of the week and subsequently fell to less than 1,000/ mm^3 , there was a 14% incidence of severe infection.A study done by Muayad Alali et al. [147] concluded that neutropenia >7 days prior to episode of FN was an independent risk factor for blood stream infection and increased length of stay. A study conducted by M.E. Santolaya et al.[51] found that mean duration of severe neutropenia (±SD) was 5.7 ± 3.9 days (range: 1–20 days) for children with IBI and 4.3 ± 2.9 days (range: 1–18 days) for children without IBI.In a study conducted by Anirban Das et al. [62], ANC < 100/ uL was seen in 31% episodes.ANC < 100/uL was seen in 4% episodes and >300/uL in 58% episodes in a study conducted by Rajan Kapoor et al.[138]and it was noted that children with profound neutropenia had a prolonged period of FN and had a fatal outcome. Berrak Oztosun et al[148] concluded thatwhen treating a patient with febrile neutropenia, if platelet transfusion is indicated, transfusing platelets in the initial days of fever reduces the duration of fever and improves the prognosis of febrile neutropenia attack.In a study conducted by Agyeman et al.[29], Platelet count <50,000 was considered as risk predictor for poor outcome.

Inflammatory Markers:

A study conducted by Ramila Shilpakar et al. [149] concluded that PCT is an effective biomarker to predict bacteremia in patients with FN undergoing chemotherapy for acute leukemia. The use of biomarkers like PCT and CRP for early prediction of bacteremia or sepsis might provide a reasonable basis for appropriate treatment, pending culture reports. [150, 151, 152]

In our study, it was found that a higher PCT and higher CRP was associated with delay in recovery & mortality as FN episodes who recovered within 1 week had lower PCT (1.54 ± 4.08) than those who recovered after 1 week (3.70 ± 9.50) or had mortality (33.93 ± 58.08).In our study, it was found that FN episodes who recovered within 1 week had lower CRP (29.99 ± 33.91) than those who recovered after 1 week (50.39 ± 56.92) or had mortality (142.42 ± 136.45).

A study from Guatemala had reported a direct association between elevated CRP and the duration of FN, bacteremia, and mortality.[153]A previous study from India reported that CRP serves as a tool for diagnosing infection and that serial monitoring is useful in assessing response to antibiotic therapy in pediatric FN. [154]In our study, we serially monitored PCT and CRP in all episodes, unlike the study done by Rajan Kapoor et al.[138] , who did not monitor CRP and PCT serially and found negative association between PCT, ANC and microbiologically detected infections.

RFT:

In our study, it was found that FN episodes who recovered within 1 week had lower creatinine (0.30 ± 0.13) than those who had mortality (0.52 ± 0.18).

In a study conducted by Mathew Fletcher et al, [136] it was seen that rising initial creatinine, presence of bacteremia, the diagnosis of acute myelogenous leukemia (AML), presentation to the emergency department, falling total WBC count, and later year of admission were also associated with the composite AE (adverse event) outcome.

LFT:

In our study, it was found that FN episodes who recovered within 1 week had lower T.Bilirubin (0.68 ± 0.37) than those who recovered after 1 week (0.73 ± 0.42) or had mortality (0.99 ± 0.24).The FN episodes who recovered within 1 week had lower D.Bilirubin (0.21 ± 0.14) than those who recovered after 1 week (0.25 ± 0.14) or had mortality (0.50 ± 0.30).The mean albumin at admission was 3.89 g/dl (±0.52). In our study, it was found that FN episodes who recovered within 1 week had higher S. albumin (4.10 ± 0.44) than those who recovered after 1 week (3.82 ± 0.42) or had mortality (3.07 ± 1.06).

A study conducted by Krishnamani et al.[121] found that on multivariate analysis there was a significant association between higher mean serum bilirubin (>1.5 mg%) and higher serum creatinine (>1.2 mg%).A study conducted by Ramzi Jeddi et al. [155] found that hypophosphatemia and hypo-proteinemia are associated with the occurrence of severe sepsis. A study conducted by Anirban Das et al. [62] found serum albumin levels <2.5 g/dl in 8.5% episodes. Importance of low albumin has been validated in other studies as well as it is a predictor of inferior outcome in many

disease states including FN, reflects complex interplay of an inflammatory state with hepatic function and glomerular filtration and is not solely a marker for undernutrition. [156,157,158]

BLOOD CULTURE:

Blood cultures were sent in all patients, and growth of micro-organisms was seen in about one-sixth (15.6%) episodes. The most common micro-organism seen was Klebsiella pneumoniae and Pseudomonas aeruginosa, followed by MRSA.

In a study conducted by Anirban Das et al. [62], blood cultures came out to be positive in 15.7% episodes. In studies conducted by Rajan Kapoor et al.[138] , Chaudhuri et al.[117] , P Dhanaleha et al.[137]and Sapna Oberoi et al. [64], blood cultures showed growth of micro-organism in 6%, 17.9%, 19.4% and 24% episodes respectively. The most common organism seen was Staphylococcus aureus (31%) followed by Klebsiella (24.1%) in study conducted by Chaudhuri et al.[117]A study conducted by M.E. Santolaya et al.[51]found that for 140 episodes in children who were IBI positive, a total of 61 bacteria (44%) recovered; the most common organisms recovered were E. coli, S. aureus, CONS, and Klebsiella species.A study done by Ramzi Jeddi et al[155] found that out of ninety-four febrile episodes observed, 27 were microbiologically documented (28.7%), six clinically documented (6.3%) and 61 fever of unknown origin (65%). Microbiologically documented infections were: 13 Gram-negative organisms, 11 Gram-positive organisms and three combined.A study conducted by Dimitrios Doganis et al.[30] concluded that obtaining blood cultures during an infection episode from all sources in a child with cancer is still mandatory as in their study, out of total 633 blood culture sets, 57 catheter positive–peripheral negative and seven catheter negative–peripheral positive cultures were seen.In a study conducted by Tugba Cetintepe et al. [159] for the duration of hospitalization of the patients with positive culture results, it was observed that those with gram negative cultures had the shortest time in the ICU, followed by those with positive fungal cultures and gram-positive cultures. It was observed that gram-negative bacterial growth significantly shortened the length of stay in ICU and all these patients died.

Table 49: Comparison of percentage of positive blood culture and commonest organism in various studies

STUDY	Percentage of positive blood culture	Commonest organism
Anirban Das et al.[62]	15.7	-
Rajan Kapoor et al.[138]	6	-
Chadhury et al.[117]	17.9	Staphylococcus aureus
P Dhanaleha et al. [137]	19.4	-
Sapna Oberoi et al.[64]	24	-
M.E. Santolaya et al.[51]	44	E.coli
Ramzi Jeddi et al. [155]	28.7	-
Our study	15.6	Klebsiella pneumoniae

Table 50: Comparison of percentage sensitivity of antibiotics in blood cultures in our study and study by P.Dhanaleha et al.

Antibiotic	E.coli		Klebsiella pneumoniae		Staphylococcus aureus		Pseudomonas aeruginosa	
	P Dhanaleha et al.[137]	Our study	P Dhanaleha et al.[137]	Our study	P Dhanaleha et al.[137]	Our study	P Dhanaleha et al.[137]	Our study
Cefoperazone-sulbactam	100%	0%	100%	0%	-	-	0%	33.3%
Amikacin	100%	100%	100%	0%	75%	-	0%	100%
Piperacillin-Tazobactam	100%	0%	100%	0%	-	-	0%	100%
Gentamicin	33.3%	100%	50%	0%	-	100%	0%	100%
Cotrimoxazole	-		-	-	12.5%	50%	-	-
Vancomycin	-		-	-	100%	100%	-	100%

URINE ROUTINE:

Urine routine sent showed pus cells in 12.5% episodes whereas majority had no pus cells.

Although a urine culture is the ‘‘golden standard’’ to prove a UTI, urinalysis is used as a rapid and sensitive screening test.[160-163] Pyuria was detected in only 4% of all UTI episodes in a study conducted by I.L.M. Klaassen et al. [164] and concluded that sensitivity of pyuria for the diagnosis of UTI is very low in neutropenic patients. In both groups, E. coli were the most common urinary pathogens accounting for 26% of UTI in the neutropenia and 58% in the control group. It has been suggested that urine culture in neutropenic patients is only indicated if there are signs or symptoms of a urinary tract infection, a urinary catheter in place, or an abnormal urinalysis.

URINE CULTURE:

Growth of micro-organism was seen in only about 10% episodes and the most common organisms isolated were E.coli (4.2%) followed by Klebsiella pneumoniae (2.1%), Pseudomonas aeruginosa (2.1%), Klebsiella ozaenae (1%), Enterococcus (1%) and Serratia liquefaciens(1%).

Pus cells were seen in 10 episodes, but urine culture came out to be positive only in 2 of these episodes. Urine culture came out to be positive in 9 episodes, of which only 2 episodes had pus cells in urine routine. This signifies that urine could be the focus of infection without evidence of pyuria in urine routine.

Urine culture showed growth of micro-organism in 16% and 11.6% episodes respectively in studies conducted by Rajan Kapoor et al.[138]and P Dhanaleha et al.[137] P Dhanaleha et al.[137] found that the most common organism was E.coli followed by Klebsiella pneumonia, findings similar to our study.

Chest X-ray:

Chest X-ray showed abnormality in one-fifth (17.6%) of FN episodes in the form of infiltrates, increased broncho-vascular markings, collapse, consolidation & pleural effusion.

A study conducted by Edith Renoult et al. [165] in total of 88 patients who experienced 170 episodes of fever. A routine admission CXR was obtained for 157 of the episodes and found 20 (12.7%) abnormal CXR (6 with a segmental or lobar

consolidation considered as a pneumonia). In addition, two patients with abnormal admission CXR developed lobar consolidation on a repeat film, later in their hospital course. A study conducted by Krishnamani et al. [121]concluded that positive findings on chest X-ray resulted in higher deaths on univariate analysis which was significant (P = 0.002).

CT Chest:

CT chest was done in 7 (7.3%) episodes in our study (in those patients whose fever persisted despite hiking up of antibiotics or who tested positive for COVID).

Rajan Kapoor et al.[138]concluded that any prolonged fever (>72 hours), pneumonia (Chest X-ray or CT scan proven), or any identified focus of infection like abscesses were considered to have clinically significant infection.

COVID RT-PCR:

All patients were tested for COVID RT-PCR. A total of 8 (8.3%) episodes tested positive for COVID.

Clostridium difficile:

Clostridium difficile was sent in about one-tenth (8.3%) of episodes, but tested positive in only 2.1% episodes.

In a study conducted by Mohammad N. Mhaissen et al. [166], a total of 158 pathogens were identified in 114 episodes of diarrhoea and Clostridium difficile was seen in 51% of theseepisodes. A study conducted by Jennifer D tieu et al. [167] found that 44 patients of total 321 patients with FN had positive C. difficile stool samples.

HOSPITAL COURSE:

Antibiotics given:

Empirical antibiotics as per the protocol (Cefoperazone-Sulbactam, Amikacin) were administered in 88 (91.7%) episodes of febrile neutropenia (Based on our previous culture sensitivity patterns). Higher antibiotics or antibiotics with gram positive coverage were added at initial presentation itself in 8.3% episodes, who had a suspicion of gram positive infection. Antibiotics were hiked up to 2nd line antibiotics in 51 (53.1%) episodes and to 3rd line antibiotics in 5 (5.2%) episodes.

No response to first line antibiotics was seen in 67.9% episodes in a study conducted by Chaudhuri et al.[117] , a figure slightly higher than in our study.In a study conducted by David Battleman et al.[66] the data suggested that in patients with significant comorbid illness, correct antibiotic selection may hasten hospital discharge.A study conducted by Natasha Ali et al.[168]used combination of piperacillin/tazobactam (4.5 g × Q8hrly) and amikacin (750 mg × once daily) most frequently in their patients. A prospective randomized clinical trial in 2010 clearly proved that the combination therapy piperacillin/tazobactam and amikacin was as effective as carbapenem monotherapy in febrile neutropenic episode.[169]

Fungal infection & need of anti-fungals:

Galactomannan was sent in about one-fourth (29%) episodes, and tested positive in 11.5% episodes. Suspicion of possible fungal infection was present in 51% (49), probable in 3.1% (3) and fungal infection could be proven in 11.46% episodes. Anti-fungals were given in 54 (56.25%) episodes.

A study done by Ban Hock Tan et al. [170] concluded that in the setting of effective anti-candidal prophylaxis, Caspofungin, Amphotericin and Voriconazole may be held off safely in the majority of febrile neutropenic patients, if the Galactomannan index is persistently negative.Microbiologically documented infections (including bacterial as well as fungal infection) were seen in 19.8% episodes of FN in a study done by Anirban Das et al. [62], out of which 79.3% were bacterial infections and 19.5% were invasive mycoses.Fungal infection was seen in 3.1% episodes in the study conducted by P Dhanaleha et al.[137]and the fungal agents were isolated from tongue scrapings and sputum.In a study conducted by Dionissios Neofytos et al.[171], it was found that among 254 consecutive AML patients, 123 (48.4%) developed an invasive fungal infection (IFI): 14 (5.5%) patients with invasive candidiasis (IC) and 108 (42.5%) patients with invasive mould infections (IMI). Among 108 IMI identified, 4 (3.7%) were proven, 1 (0.9%) probable, and 103 (95.4%) were possible, using current definitions.In a study conducted by Maria E. Santolaya et al.[95], it was seen that the number of days of hospitalization was 19 in the empirical arm and 17 in the pre-emptive arm (P=0.15) and the need for ICU was 25% in the empirical arm and 20% in the pre-emptive arm (P=0.47), concluding that Pre-emptive antifungal therapy was as effective as empirical antifungal therapy in children with cancer, fever and neutropenia, significantly reducing the use of antifungal drugs.

Need of anti-virals:

Anti-virals (Acyclovir) were given in only 1 (1%) episode with Herpes labialis.

In a study conducted by Mathew Fletcher et al, [136] it was seen that bacteremia occurred in 12.1% of hospitalized patients, and viral infections were seen in 8.4% of hospitalizations.In a study conducted by Judith A.E M. Zecha et al.[172], it was found that herpetic lesions in patients receiving chemotherapy can be painful and may be associated with hemorrhage and necrosis, and bacterial and fungal superinfections. In myelosuppressed patients, HSV infection has atypical clinical manifestations, mainly manifesting as intraoral ulcerations with or without labial involvement.

Time to defervescence& Duration of neutropenia:

The average time to defervescence of fever was 6.77 days (± 3.97). It was seen that FN episodes taking longer time to defervescence of fever took longer time to recovery. The FN episodes recovering within 1 week had a mean time to defervescence of 4.38 (± 1.60) days whereas those recovering after 1 week had a mean time to defervescence of 8.62 (±4.26) days. p-value came out to be significant (0.001).The mean duration of neutropenia was longer in episodes having delay than those with no delay (6.31 days v/s 5.71 days).

In the study conducted by P Dhanaleha et al.[137] fever persisted for more than 48 hours in 80.2% episodes and for more than 72 hours in 40.7% episodes. The mean duration of episode was 4.26 (±1.189) days.

Requirement of oxygen, ventilation, inotropes, blood products, PICU transfer:

Requirement of oxygen was seen in seventeen (17, 17.7%) episodes. In our study, it was found that 17 (17.7%) episodes had requirement of oxygen, and most (53.0%) of them recovered after 1 week and only few (23.5%) recovered within 1 week. 23.5% of these episodes had mortality. p-value came out to be significant (0.001).

Non-invasive ventilation was initiated in less than 10 percent (7, 7.3%) episodes and failure of non-invasive ventilation was seen in 4 (4.2%) episodes, who were put on invasive ventilation. Seven (7, 7.3%) episodes had requirement of ventilation, and most (28.6%) of them recovered after 1 week and only few (14.3%) recovered within 1 week. About sixty (57.1%) of these episodes had mortality. p-value came out to be significant (0.001).

Complications in the form of respiratory failure, shock, necrotising enterocolitis, renal failure, cardiac failure, encephalopathy and need of ICU were seen in 26% and 23% episodes respectively in studies conducted by Anirban Das et al[62]. and Sapna Oberoi et al. [64] respectively. Respiratory failure was seen in 12% episodes in the study conducted by Anirban Das et al. [62]A study conducted by David Schnell et al.[173] concluded that acute respiratory failure should be considered as a therapeutic emergency in critically ill patients with neutropenia and invasive mechanical ventilation should probably not be delayed only as a consequence of neutropenia, underlying malignancy, or immunocompromised status.Studies done by Tao Wang et al.[174]found non-invasive mechanical ventilation to be associated with a decreased rate of invasive mechanical ventilation and mortality in critically ill cancer patients with acute respiratory failure.

Inotropes were required in 7 (7.3%) episodes. It was found that 7 (7.3%) episodes had requirement of inotropes, and most (57.1%) of them had mortality and only few (42.9%) recovered after 1 week. None of the episodes who recovered within one week required inotropes. p-value came out to be significant (0.001).
A study conducted by Kumar et al [68] found that in cases with severe sepsis, each hour of delay in antibiotic administration over the ensuing 6 hours of onset of hypotension has been found to be associated with an average decrease in survival of 7.6%. Fluid refractory shock was seen in 12% episodes in study conducted by Anirban Das et al. [62]In a study conducted by Mathew Fletcher et al, [136] the composite AE outcome was seen in 11.1% of admissions including 0.7% mortalities in hospital, 4.7% PICU admission, and 10.1% fluid resuscitation. Of the patients who expired or required admission to PICU, 91% had fluid resuscitation >40 ml/kg.In a study conducted by Sapna Oberoi et al.[11], it was found that mortality in the patients who presented with septic shock was higher as compared to others (22 vs 4.6 %, p=0.002).

Transfer to PICU was required in 7 (7.3%) episodes. The FN episodes who recovered within 1 week had no requirement of PICU. The FN episodes who recovered after 1 week had lesser duration of PICU stay (days) (5.67 ± 4.04) than those who had mortality (3.75 ± 2.36). p-value came out to be insignificant (0.461).

Transfer to PICU was required in 6.7% episodes in study conducted by Anirban Das et al. [62]In a study conducted by Tugba Cetintepe et al. .[162], it was concluded that the risk of mortality is high for the FN cases in need of mechanical ventilation and positive inotropic support. Respiratory failure was the most common reason for ICU transfer, in 38.5% of the patients, followed by sepsis in 25%, cardiac failure in 10%, neurological reasons in 13.3%, and the need for resuscitation in 13.3% of the cases.The patients who needed mechanical ventilation at the time of admission to the ICU had a short ICU stay and this was statistically significant (p = 0.002).

Blood products were required in two-third (65, 67.7%) episodes.
In a study conducted by Krishnamani et al. .[121], it was concluded that patients who receive multiple transfusions are more sick, have concomitant underlying problems like thrombocytopenia, coagulation abnormalities, liver disease, uremia etc., which worsens their outcome.

OUTCOME:

Less than half of the episodes (40, 41.7%) showed recovery within one week,
Nearly 52 (54.2%) episodes showed recovery after one week,
One (1, 1%) episode went discharge against medical advise and
Three (3, 3.1%) episodes had mortality.

Mortality rate was 6%, 10% and 20.8% respectively in studies conducted by Sapna Oberoi et al. [64], Anirban Das et al [62] and Chaudhuri et al.[117]In a study conducted by Mathew Fletcher et al, [136] the composite AE outcome was seen in 11.1% of admissions including 0.7% mortalities in hospital and 4.7% PICU admission.

DELAY V/S NON-DELAY:

TIME TO ANTIBIOTIC ADMINISTRATION:

The average time to antibiotics in 96 episodes of FN was 317 (± 676.6) minutes.The duration between onset of fever and arrival to hospital in 71 episodes of FN (outpatients) was 364 (± 749.6) minutes. This duration was applicable only for outpatients.The duration between arrival to hospital and administration of antibiotics was 47 (± 72.7) minutes.In our study, it was found that FN episodes who recovered within 1 week had lesser duration between onset of fever and arrival to hospital (310.36 ± 822.72) than those who recovered after 1 week (397.69 ± 735.48) or had mortality (423.75 ± 348.22).p-value came out to be insignificant (0.887).

The average door to needle time was 5.5±3.5 hours in a study conducted by David Battleman et al.[66]In a study conducted by Sapna Oberoi et al. [64], the median symptom to door interval was 13 hours and the travelling time was 30 minutes. They did not calculate the duration between arrival to hospital and antibiotic administration, unlike our study.The median time to antibiotic was 2.5 hours in a study conducted by Thomas Perron et al.[175]

DELAY:

Delay in administration of antibiotics within golden hour was seen in 58 (60.4%) episodes, whereas 38 (39.6%) episodes had no delay in receiving antibiotics. Out of 58 episodes who had delay in receiving antibiotics, 52 (89.7% of 58, 54.2% of total 96 patients) had delay before arrival to hospital and 6 (10.3% of 58, 6.3% of total 96 patients) had delay after arrival to hospital. p-value came out to be 0.000 (significant).In our study, it was found that episodes who recovered within 1 week had lesser duration between arrival to hospital and antibiotic administration (minutes) (34.50 ± 22.01) than episodes who recovered after 1 week (56.35 ± 94.76) or had mortality (61.25 ± 70.28). p-value came out to be insignificant (0.339).

In a study conducted by Sapna Oberoi et al. [64], only 1% episodes reached hospital within 1 hour, 42% reached within 2-12 hours, 30% reached within 13-24 hours and 27% reached after 24 hours.In a study conducted by Thomas Perron et al. [175], only 9% episodes received antibiotic within an hour of registration. About 95% received

antibiotic within 9.3 hours and delay over 5 hours was noted in 20% episodes.In a study conducted by Namrata Todurkar et al.[131] , only 34% episodes received antibiotics within one hour and 66% received antibiotic after one hour.

CAUSE OF DELAY:

Cause of delay was non-availability of transport in 32 (33.3%) episodes, ingestion of NSAIDs at home in 15 (15.6%) episodes, unawareness of situation in 6 (6.3%) episodes and hospital related causes in 6 (6.3%) episodes.

The commonest cause of delay in the study conducted by Sapna Oberoi et al. [64] was ingestion of NSAID, followed by inability to comprehend situation, unawareness of parents, chemotherapy induced fever, financial constraints and non-availability of transport.Delayed administration of antibiotic by staff followed by prolonged time to assessment by junior staff, lack of awareness of natural evolution of course, failure of emergency department to stock appropriate antimicrobial therapy and lack of distinct protocol were the common causes of delay in study conducted by Thomas Perron et al. [175]Physician level causes (73%) followed by logistical issues (45%) and nursing level causes (32%) were the common causes of delay in the study conducted by Namrata Todurkar et al.[131]

CORRELATION BETWEEN INITIAL RISK STRATIFICATION SCORING IN PATIENTS WITH DELAY V/S NON-DELAY:

Mean risk stratification score was 8.68 (±1.579) in episodes with no delay whereas it was higher in episodes with delay (9.03 ± 1.544). p-value came out to be 0.284 (non-significant).

TIME TO DEFERVESCENCE OF FEVER:

The FN episodes who had delay in receiving antibiotics had a longer time to defervescence of fever (7.67 ± 3.817 days) than those who had no delay in receiving antibiotics (5.50 ± 3.875 days).

REQUIREMENT OF OXYGEN, REQUIREMENT OF PICU, REQUIREMENT OF VENTILATION, REQUIREMENT OF INVASIVE VENTILATION, REQUIREMENT OF INOTROPES, REQUIREMENT OF BLOOD PRODUCTS :

Amongst the FN episodes who had delay, one-fourth (14, 24.14%) episodes required oxygen whereas only 3 (7.89%) episodes with no delay required oxygen. p-value came out to be 0.056 (non-significant).Amongst the episodes who had delay, 5 (8.62%) required transfer to PICU whereas only 2 (5.26%) episodes required transfer to PICU amongst non-delay group. p-value came out to be 0.536 (non-significant).
In a study conducted by Jennifer L. Salstrom et al.[135] on pediatric patients who received antibiotics for Febrile Neutropenia in less than 60 min, found that they have decreased Intensive care needs. The analysis revealed a statistically significant 20% decrease in the need for ICU care when TTA is <60 min.

Amongst the FN episodes who had delay, 6 (10.34%) required ventilation (non-invasive) whereas only 1 (2.63%) episode required non-invasive ventilation amongst non-delay group. p-value came out to be 0.155 (non-significant). Amongst the episodes who had delay, 3 (5.17%) required invasive ventilation whereas only 1 (2.63%) episode required invasive ventilation amongst non-delay group. p-value came out to be 0.542 (non-significant). Amongst the episodes who had delay, 7 (7.3%) required inotropes whereas only 2 (5.26s%) episodes required inotropes amongst non-delay group. p-value came out to be 0.536 (non-significant). Amongst the episodes who had delay, 41 (70.69%) required blood products whereas only 24 (63.16%) required blood products amongst the non-delay group. p-value came out to be 0.506 (non-significant).

The effect of coming early to hospital on morbidity could not be demonstrated in the study conducted by Sapna Oberoi et al. [64]

DURATION OF ANTIBIOTICS, DURATION OF PICU STAY, DURATION OF INOTROPES, DURATION OF HOSPITAL STAY (DAYS), NUMBER OF PACKED CELL & RDP TRANSFUSED:

The mean duration of antibiotics (days) in FN episodes with no delay was 7.11 (±3.71) and 9.26 (±4.27) in those with delay. p-value came out to be 0.013 (significant).
In a study conducted by Rajan Kapoor et al.[138] , duration of antibiotics was less than 7 days in majority (76%) of the cases.

The mean duration of PICU stay (days) in FN episodes with no delay was 6.00 (±5.66) and 4.00 (±2.12) in patients with delay. p-value came out to be 0.484 (non-significant). The mean duration of inotropes (days) in episodes with no delay was 4.50 (±3.54) and 3.20(±1.79) in episodes with delay. p-value came out to be 0.520 (non-significant). The mean duration of hospital stay (days) in episodes with no delay was 8.29(±4.23) and 10.34 (±4.53) in episodes with delay. p-value came out to be 0.028 (non-significant). The mean number of Packed cell transfused in episodes with no delay was 1.18 (±0.39) and 1.39(±0.89) in episodes with delay. p-value came out to be 0.292 (non-significant). The mean number of RDP transfused in episodes with no delay was 1.50 (±0.65) and 2.38(±2.60) in episodes with delay. p-value came out to be 0.222 (non-significant).

Research conducted by Battleman, Callahan, and Thaler (2002) [66] looked at the correlation between treatment for community-acquired pneumonia to the variation in length of hospital stay (LOS). They found a correlation to decreased LOS if patients received antibiotics in the emergency department before being admitted to the floor. In a study conducted by Thomas Perron et al.[175], it was concluded that in the multivariate analysis time-to- antibiotic administration was significantly correlated with longer hospital stay. A positive relationship was present between delay in antibiotic administration and a longer hospital stay.In a study conducted by David Battleman et al.[66], it was observed that rapid antibiotic initiation and appropriate antibiotic selection in the emergency department have statistically significant association with shorter length of stay. The length of stay for patients treated in emergency department was 6.3±3.5 days, while the LOS for patients receiving antibiotic therapy that was started on reaching in-patient floor was 8.4±4.7 days.

OUTCOME:

Amongst the FN episodes who had delay, 18 (31.3%) recovered within 1 week whereas 22 (57.89%) recovered within 1 week amongst the non-delay group. p-value came out to be 0.011 (significant). Amongst the FN episodes who had delay, 36 (62.07%) recovered after 1 week whereas 16 (42.11%) recovered after 1 week amongst the non-delay group. p-value came out to be 0.055 (non-significant). Amongst the FN episodes who had delay, 1 (1.72%) went DAMA whereas none (0%) went DAMA amongst the non-delay group. p-value came out to be 0.416 (non-

significant). Amongst the FN episodes who had delay, 3 (5.17%) had mortality whereas none (0%) had mortality amongst the non-delay group. p-value came out to be 0.154 (non-significant).

A study conducted by Jennifer L. Salstrom et al.[135] concluded that achieving a TTA < 60 min was also associated with decreased mortality (mortality was 3.9% if TTA > 60 min compared to 0.7% if TTA < 60 min).

The major limitation of study conducted by Thomas Perron et al. [175] and most other studies was that none of the studies revealed association between delay in antibiotic administration and hospital mortality or ICU admission.

Table 51: Comparison of average time to antibiotic, commonest cause of delay and impact of delay in different studies

Author	Percentage of patients receiving antibiotic within one hour	Average time from onset of fever to arrival at hospital	Average time from arrival to hospital and antibiotic administration	Average total time to antibiotic administration	Commonest cause of delay	Impact of delay
David Battleman et al.[66] (2002)	-	-	-	5.5 ± 3.5 hours	-	Longer hospital stay
Sapna Oberoi et al.[64] (2012)	1%	13 hours	-	-	Ingestion of NSAID	-
Thomas Perron et al.[175] (2014)	9%	-	-	2.5 hours	Delayed administration of antibiotic by staff	Longer hospital stay
Namrata Todurkar et al.[131] (2021)	34%	-	-	-	Physician level causes	-
Our study	39.6%	6.06 hours (364 minutes)	47 minutes	5.28 hours (317 minutes)	Non-availability of transport	Longer time to defervescence of fever/ duration of antibiotics/ duration of PICU stay/ duration of inotropes. Increased requirement of oxygen/ventilation/PICU/ inotropes.

SUMMARY AND CONCLUSION

During the study period (from 1st March 2021 to 31st May 2022), a total of 2010 patients were admitted in Paediatric Oncology Unit. Amongst these, 1284 patients were admitted for administration of chemotherapy, 312 patients were admitted for transfusion of blood products and 414 patients were admitted with fever. Ninety-six (96) episodes of FN in 71 patients were categorized as high risk. The remaining low risk patients were excluded from the study.

DEMOGRAPHICS:

- The mean age was 7.62 (± 4.88) years.
- Maximum number of children (38%) were in the age group of <5 years, followed by 5-10 years and >10 years.
- The male:female ratio was 3.17:1.
- Malnutrition was present in 15.5% patients and 11.3% patients were over-nourished.
- The commonest malignancy was ALL (59.3%) followed by AML and Ewing's sarcoma.
- Most (80.2%) FN episodeswere in Intensive phase of chemotherapy.
- About sixty (59.4%) FN episodes had been administered chemotherapy within 7 days prior to onset of fever.
- Fever was documented at home in maximum (80.2%)episodes.
- Majority (75%) of the episodes had PICC line in-situ.
- The FN episodes having higher risk stratification score at admission took longer time to recovery.

CLINICAL FEATURES:

- The commonest focus of infection was Gastro-intestinal tract followed by Respiratory system.
- Nearly a quarter of FN episodes had mucositis and most had grade 2 of mucositis.
- The commonest symptom was diarrhoea followed by cough.

INVESTIGATIONS:

- The mean TLC at admission was 1.25 x 10^3/uL, mean ANC at admission was 502 mm^3, mean Platelet count was 104.72 x 10^3/uL, mean Hb was 8.86 gm/dl, mean PCT at admission was 3.75 ng/ml, mean CRP was 45.67 mg/lt and mean albumin was 3.89 gm/dl.
- The FN episodes who recovered after 1 week had lower TLC, lower ANC, lower Platelet count, lower Hb, higher PCT, higher CRP, higher creatinine, higher bilirubin and lower albumin.
- About one-sixth of FN episodes (15.6%) had positive blood culture and one-tenth (10%) had positive urine culture.
- Chest X-ray showed abnormality in nearly one-fifth of episodes (17.6%) and CT chest showed abnormality in less than 10% episodes. COVID-RTPCR tested positive in 8% episodes.
- FN episodes with suspected fungal infection were tested for Galactomannan and 11.5% tested positive for Galactomannan.
- FN episodes with suspected diarrhoea were tested for Clostridium difficile and only 2 (2.1%) tested positive.

HOSPITAL COURSE:

- Empirical antibiotics as per the protocol (Cefoperazone-Sulbactam, Amikacin) were administered in most (91.7%) episodes. Antibiotics were hiked up to 2nd line antibiotics in half of the episodes (53.1%) and to 3rd line antibiotics in only 5 (5.2%) episodes.
- Suspicion of possible fungal infection was present in half (51%) of the episodes and fungal infection could be proven in 11.46% episodes. Anti-fungals were given in all these episodes.
- The average time to defervescence of fever was 6.77 days. It was seen that FN episodes taking longer time to defervescence of fever took longer time to recovery (4.38 days v/s 8.62 days for recovery within 1 week and after 1 week respectively).
- Nearly one-fifth episodes(17.70%) required oxygen support, 7.3% required inotropic support and PICU transfer. Non-invasive

ventilation was initiated in less than 10% episodes and 4.2% of these episodes were put on invasive ventilation.

- Those who required oxygen/ventilation/ inotropic support/ PICU transfer/blood product transfusion took a longer time to recovery.

OUTCOME:

- Less than half of the episodes (40, 41.7%) showed recovery within one week. Nearly half (54.2%) episodes showed recovery after one week. One (1%) episode went discharge against medical advise and three (3.1%) episodes had mortality.

DELAY V/S NON-DELAY:

TIME TO ANTIBIOTIC ADMINISTRATION:

- The average time to antibiotics in 96 episodes of FN was 317 minutes. The duration between onset of fever and arrival to hospital in 71 episodes of FN (outpatients) was 364 minutes. This duration was applicable only for outpatients.The duration between arrival to hospital and administration of antibiotics was 47 minutes.

DELAY:

- Delay in administration of antibiotics within golden hour was seen in nearly two-third (60.4%) episodes. Amongst episodes who had delay in receiving antibiotics, nearly 90 percent (89.7%) had delay before arrival to hospital and 10.3% had delay after arrival to hospital.
- The most common cause of delay was non-availability of transport in about one-third (33.3%) episodes followed by ingestion of NSAIDs at home, unawareness of situation and hospital related causes.
- The FN episodes who had delay in receiving antibiotics had a longer time to defervescence of fever (7.67 days) than those who had no delay in receiving antibiotics (5.50 days).

DELAY V/S OUTCOME:

- A higher number of FN episodes required oxygen/ transfer to PICU/Non-invasive & invasive ventilation/inotropic support/blood product transfusion amongst episodes who had delay in receiving antibiotics than those who had no delay in receiving antibiotics (24% v/s 7.89%, 8.62% v/s 5.26%, 10.34% v/s 2.63%, 5.17% v/s 2.63%, 7.3% v/s 5.26% and 70.69% v/s 63.16% respectively).
- The mean duration of antibiotics and mean duration of hospital stay was longer in episodes who had delay in receiving antibiotics (7.11 v/s 9.26 days and 8.29 v/s 10.34 days).
- Amongst the episodes who had delay,most (62.07%) episodes recovered after 1 week and fewer(31.3%) recovered within 1 week.
- In contrast,more number of episodes (57.89%) recovered within 1 week amongst the non-delay group and fewer (42.11%) recovered after 1 week.
- Amongst the episodes who had delay, 3 (5.17%) had mortality whereas none (0%) had mortality amongst the non-delay group.

HOW OUR STUDY IS DIFFERENT:

The current study identified that the greatest hurdle in administering antibiotic within the golden hour is difficulty in transport & time spent in travelling to a dedicated unit. It provides basis for future studies like outcome of shared care or administration of first dose as oral antibiotics.

Regular sensitisation of nursing staff to administer antibiotic in a child with febrile neutropenia immediately at arrival without waiting for other formalities to be completed resulted in a shorter interval to antibiotic administration in our cohort.

There are a very few studies comparing the outcome between patients receiving antibiotic within the golden hour and those having delay in receiving antibiotics. Our study is one of the few studies to analyse the impact of delay in receiving antibiotics on the outcome of patients.

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Sr. No	MRD NO	DATE OF ADMISSION	NAME	TIME OF ADMISSION	PHO FILE NO	Age (Years)	Age group	Gender	Weight (kg)	Height (cm)	Weight centile	Height centile	BMI centile	Grade of nutrition	Body mass index	Mid upper arm circumference	Diagnosis (type of malignancy)	Stage/Risk_Standard	Stage/Risk_Intermediate
1	934745	3/2/2021	J	7:11 PM	2021011458	7	2	Male	22	128	3rd-97th	3rd-97th	3rd-97th	-	13.43	16	Ewing sarcoma	y	-
2	1004593	3/2/2021	J	8:56 PM	2021011466	4	1	Female	13.5	96.5	3rd-97th	3rd-97th	-	-	14.67	12	B-ALL	-	y
3	967918	3/3/2021	SP	9:28 AM	2021011505	7	2	Male	22	122	3rd-97th	3rd-97th	3rd-97th	-	14.78	14	Hodgkin Lymphoma	-	y
4	930891	3/5/2021	RKP	11:56 AM	2021011978	16	3	Male	38	159	3rd-97th	3rd-97th	3rd-97th	-	15.03	13	ALK+ ALCL	y	-
5	1001038	3/9/2021	KK	4:36 PM	2021012869	6	2	Female	13.6	110	<3rd	3rd-97th	<3rd	Under-weight	11.23	13	Ewing sarcoma	y	-
6	1012023	3/9/2021	I	9:10 PM	2021012905	11	3	Female	25	139	3rd-97th	3rd-97th	<3rd	Under-weight	13.1	16.5	Osteosarcoma	y	-
7	978832	3/11/2021	AB	12:27 AM	2021013141	16	3	Male	50	174	3rd-97th	3rd-97th	-	-	16.5	16	Ewing sarcoma	y	-
8	1007143	3/7/2021	SI	5:53 PM	2021012424	3	1	Male	10.8	98	<3rd	3rd-97th	-	Under-weight	11.25	13.5	T-ALL	-	y
9	988999	3/13/2021	B	10:02 AM	2021013667	2	1	Female	10.7	88	3rd-97th	3rd-97th	-	-	13.8	11	B-ALL	-	y
10	1007803	3/21/2021	D	11:20 AM	2021015204	2	1	Male	14	91	3rd-97th	3rd-97th	-	-	16.9	11.5	B-ALL	y	-
11	968727	3/27/2021	SS	2:42 PM	2021016525	7	2	Male	17.1	118	3rd-97th	3rd-97th	<3rd	Under-weight	12.28	15	B-ALL	y	-
12	1054345	4/6/2021	E	7:03 PM	2021018539	14	3	Male	72	180	3rd-97th	>97th	>97th	Over-weight	22.2	16.5	Burkitt's lymphoma	-	-
13	1027876	3/30/2021	R	4:30 AM	2021016874	8	2	Female	24.8	136	3rd-97th	3rd-97th	-	-	13.47	15.5	AML	-	-
14	934745	3/29/2021	J	12:10 AM	-	7	2	Male	22	128	3rd-97th	3rd-97th	3rd-97th	-	13.43	15	Ewing sarcoma	y	-
15	930891	4/10/2021	RKP	12:56 PM	2021019292	16	3	Male	38	159	3rd-97th	3rd-97th	3rd-97th	-	15.03	13	ALK+ ALCL	y	-
16	1026634	4/7/2021	TSB	1:42 PM	2021018703	4	1	Male	13.2	102	3rd-97th	3rd-97th	-	-	12.6	12.5	B-ALL	-	y
17	1047635	4/13/2021	J	8:55 AM	2021019731	17	3	Female	35.6	153	<3rd	3rd-97th	<3rd	Under-weight	15.21	14.5	AML	-	-
18	1060418	4/5/2021	AK	10:26 AM	2021018142	2	1	Male	15.5	94	>97th	>97th	-	-	17.5	12.5	Burkitt's lymphoma	y	-
19	968429	4/17/2021	HS	7:25 AM	-	4	1	Male	15	102	3rd-97th	3rd-97th	-	-	14.1	12.5	T-ALL	-	-
20	978832	3/11/2021	AB	9:35 PM	-	16	3	Male	50	174	3rd-97th	3rd-97th	3rd-97th	-	16.5	16	Ewing sarcoma	y	-
21	986585	4/21/2021	D	3:46 AM	2021021191	3	1	Male	11.5	94	3rd-97th	3rd-97th	-	-	13	12.5	B-ALL	-	y
22	980697	4/30/2021	M	10:56 PM	2021022621	5	2	Female	15	112	3rd-97th	3rd-97th	-	-	12	12	B-ALL	y	-
23	986965	5/1/2021	H	8:57 PM	2021022757	2	1	Female	10.5	89	3rd-97th	3rd-97th	-	-	13.3	12	B-ALL	-	y
24	1099577	4/30/2021	E	1:24 AM	2021022513	14	3	Male	70	177.5	3rd-97th	>97th	-	-	23.6	14.5	B-ALL	-	y
25	1001038	5/3/2021	KK	12:31 PM	2021022967	6	2	Female	13	110	<3rd	3rd-97th	<3rd	Under-weight	11.2	13	Ewing sarcoma	y	-
26	1083562	4/30/2021	B	3:19 PM	2021022599	13	3	Male	37	160	>97th	3rd-97th	3rd-97th	-	14.5	14.5	B-ALL	-	-
27	988999	5/4/2021	B	10:55 AM	2021023106	2	1	Female	10.4	88	3rd-97th	3rd-97th	-	-	13.6	11	B-ALL	-	y
28	408381	5/11/2021	D	1:38 PM	2021023927	4	1	Female	14.5	108	3rd-97th	3rd-97th	-	-	12.4	12	B-ALL	y	-
29	999774	5/18/2021	DB	9:45 PM	2021024907	11	3	Male	34.5	153	3rd-97th	3rd-97th	-	-	14.52	16.5	Osteosarcoma	-	y
30	1027876	5/19/2021	R	9:16 AM	2021024929	8	2	Female	24	136	>97th	3rd-97th	3rd-97th	-	13	14	AML	-	-
31	1007803	6/11/2021	D	12:57 PM	2021028701	2	1	Male	14	91	3rd-97th	3rd-97th	-	-	16.9	12.5	B-ALL	y	-
32	1054345	6/14/2021	E	10:12 AM	2021029110	14	3	Male	72	180	3rd-97th	>97th	>97th	-	22.2	16.5	Burkitt's lymphoma	-	-
33	1007803	6/19/2021	D	7:50 PM	2021030271	2	1	Male	14	91	3rd-97th	3rd-97th	-	-	16.9	12.5	B-ALL	y	-
34	1034139	6/15/2021	P	12:06 AM	2021029286	3	1	Male	11.6	96	3rd-97th	3rd-97th	-	-	12.6	12	B-ALL	y	-
35	1083562	6/16/2021	B	4:30 PM	2021029690	13	3	Male	29.5	160	3rd-97th	3rd-97th	<3rd	Under-weight	11.5	14.5	Burkitt's lymphoma	-	-
36	1111596	6/15/2021	VM	12:24 PM	2021029392	7	2	Male	22	128	3rd-97th	3rd-97th	3rd-97th	-	13.7	12.5	AML	-	-
37	999774	6/19/2021	DB	5:40 PM	2021030274	11	3	Male	27	153	3rd-97th	3rd-97th	<3rd	-	14.52	13.5	Osteosarcoma	-	y
38	1051603	6/18/2021	S	1:35 PM	2021030034	7	2	Male	25	116	3rd-97th	3rd-97th	>97th	Over-weight	18.6	12	B-ALL	y	-
39	1115760	6/15/2021	J	10:09 AM	2021029329	2	1	Male	10	72	3rd-97th	<3rd	-	-	19.3	11.5	B-ALL	-	-
40	1111596	7/2/2021	VM	9:55 AM	2021032645	7	2	Male	22.5	128	3rd-97th	3rd-97th	-	-	13.7	12.5	AML	-	-
41	1083562	7/4/2021	B	12:20 AM	2021032871	13	3	Male	30	160	3rd-97th	3rd-97th	<3rd	Under-weight	11.7	14.5	B-ALL	-	-
42	930891	7/6/2021	RKP	4:31 PM	2021033379	17	3	Male	37.8	159	<3rd	3rd-97th	<3rd	Under-weight	15	13	ALK+ ALCL	y	-
43	1123830	7/5/2021	APS	12:49 PM	2021033088	7	2	Male	20.4	120.5	3rd-97th	3rd-97th	3rd-97th	-	14	13.5	B-ALL	-	y
44	1009172	7/5/2021	L	12:33 PM	2021033079	9	2	Male	19	124	<3rd	3rd-97th	<3rd	Under-weight	12.4	14	B-ALL	-	y
45	1075035	7/17/2021	N	5:08 PM	2021035607	15	3	Male	67	170	3rd-97th	3rd-97th	>97th	Over-weight	23.2	15.5	Ewing sarcoma	-	y
46	1073267	7/12/2021	SK	4:57 PM	2021034544	14	3	Male	42	162	3rd-97th	3rd-97th	3rd-97th	-	16	15	T-ALL	-	-
47	932574	10/4/2021	A	1:52 PM	2021053506	6	2	Male	15	112	3rd-97th	3rd-97th	<3rd	Under-weight	12	13	AML	-	-
48	867814	10/3/2021	A	11:56 AM	2021053218	4	1	Male	14	98	3rd-97th	3rd-97th	-	-	14.6	12.5	B-ALL	-	y
49	924163	10/3/2021	P	12:25 PM	2021053224	3	1	Male	11	86	<3rd	<3rd	-	Under-weight	14.9	14.5	AML	-	-
50	1116685	10/8/2021	TM	3:52 PM	2021054726	4	1	Male	10.7	97	<3rd	3rd-97th	-	-	11.4	12.5	B-ALL	y	-
51	992452	10/10/2021	R	2:06 PM	2021055151	3	1	Male	12.7	85	3rd-97th	<3rd	-	-	17.6	13	B-ALL	-	y
52	1027876	10/9/2021	R	6:52 PM	2021055018	8	2	Male	25.4	125	3rd-97th	3rd-97th	3rd-97th	-	16.3	14.5	AML	-	-
53	1149579	10/7/2021	BS	11:20 AM	2021054344	14	3	Male	34	158	3rd-97th	3rd-97th	<3rd	-	13.6	15	B-ALL	-	-
54	1152070	10/10/2021	PS	3:31 PM	2021055163	7	2	Male	20	116	3rd-97th	3rd-97th	3rd-97th	-	14.9	15	AML	-	-
55	1073267	10/7/2021	SK	1:42 AM	2021054255	14	3	Male	42	162	3rd-97th	3rd-97th	3rd-97th	-	16	15	T-ALL	-	-
56	1140002	11/17/2021	BS	2:43 PM	2021064720	7	2	Female	20	129	3rd-97th	3rd-97th	<3rd	Under-weight	12	13	B-ALL	-	-
57	1141514	11/19/2021	NS	7:40 PM	2021065238	9	2	Male	17	130	<3rd	3rd-97th	<3rd	Under-weight	10.1	12.5	Hodgkin Lymphoma	y	-
58	1197282	12/29/2021	BK	11:10 AM	2021074463	4	1	Female	15.6	102	3rd-97th	3rd-97th	-	-	15	12.5	B-ALL	-	y
59	1114766	12/31/2021	AT	6:33 PM	2021074872	12	3	Male	30.3	145	3rd-97th	3rd-97th	3rd-97th	-	14.4	13.5	B-ALL	y	-
60	1034748	1/2/2022	S	10:33 AM	2022000274	8	2	Male	22.3	124	3rd-97th	3rd-97th	3rd-97th	-	14.5	14.5	B-ALL	y	-
61	1123830	1/5/2022	APS	10:14 AM	2020001543	7	2	Male	21	121	3rd-97th	3rd-97th	3rd-97th	-	14.3	14	B-ALL	-	y
62	1227585	1/6/2022	KA	5:20 PM	2022001171	11	3	Female	56	140	>97th	3rd-97th	>97th	obese	28.6	17	Ewing sarcoma (Renal PNET)	-	-
63	1099662	2/17/2022	AS	4:08 PM	2022009489	9	2	Male	25	126	3rd-97th	3rd-97th	3rd-97th	-	15.7	15	B-ALL	y	-

Sr. No	MRD NO	Stage/Risk_High	Phase of Chemotherapy_ Intensive phase	Phase of Chemotherapy_ Maintenance phase	days sinse last CHEMOTHERAPY	Presentaion As Inpatient	time since last discharge <72 hours/> 72 HOURS	PICC line	Mucositis	Mucositis GRADE	Peri-Anal Involvement	Peri-Anal Involvement	GIT symptoms	Pain abdomen	Pain abdomen At presentation	Pain abdomen During hospital stay	Diarrhoea	bloody_At presentation	bloody During hospital stay
1	934745	-	y	-	>7	-	2	y	y	2	-	n	y	-	-	-	-	-	-
2	1004593	-	y	-	<7	-	2	y	y	1	-	n	y	-	-	-	-	-	-
3	967918	-	y	-	>7	y	-	n	-	-	-	n	-	-	-	-	-	-	-
4	930891	-	y	-	<7	-	2	n	-	-	-	n	-	-	-	-	y	-	y
5	1001038	-	y	-	>7	-	2	y	y	3	y	-	y	-	-	-	-	-	-
6	1012023	-	y	-	<7	-	2	y	y	2	-	n	y	y	y	-	y	-	-
7	978832	-	y	-	>7	y	-	y	y	2	-	n	y	-	-	-	-	-	-
8	1007143	-	y	-	<7	y	-	y	-	-	-	n	y	-	-	-	y	-	-
9	988999	-	y	-	<7	-	1	n	-	-	-	n	-	-	-	-	-	-	-
10	1007803	-	y	-	<7	-	2	y	-	-	-	n	-	-	-	-	-	-	-
11	968727	-	y	-	<7	-	2	y	y	2	-	n	y	-	-	-	-	-	-
12	1054345	y	y	-	<7	-	2	y	-	-	-	n	-	-	-	-	-	-	-
13	1027876	y	y	-	>7	-	2	y	-	-	-	n	-	-	-	-	-	-	-
14	934745	-	-	y	<7	-	2	y	-	-	-	n	-	-	-	-	-	-	-
15	930891	-	-	y	>7	-	2	n	-	-	-	n	-	-	-	-	-	-	-
16	1026634	-	y	-	>7	y	2	y	y	1	-	n	y	-	-	-	y	-	y
17	1047635	y	y	-	<7	-	2	y	-	-	-	n	-	-	-	-	-	-	-
18	1060418	-	y	-	<7	y	-	y	y	2	-	n	y	y	y	-	y	-	-
19	968429	y	y	-	<7	-	2	y	y	2	-	n	y	y	y	-	y	-	-
20	978832	-	y	-	>7	-	2	y	-	-	-	n	-	-	-	-	-	-	-
21	986585	-	y	-	<7	-	2	y	-	-	-	n	y	-	-	-	y	-	-
22	980697	-	y	-	>7	-	2	y	-	-	-	n	-	-	-	-	y	-	-
23	986965	-	y	-	<7	-	2	y	-	-	-	n	-	-	-	-	-	-	-
24	1099577	-	y	-	<7	y	-	y	y	3	-	n	y	-	-	-	y	-	-
25	1001038	-	y	-	>7	-	2	y	y	3	-	n	y	-	-	-	-	-	-
26	1083562	y	y	-	<7	y	1	y	y	2	-	n	y	y	-	y	-	-	-
27	988999	-	y	-	<7	-	2	y	-	-	-	n	y	-	-	-	y	-	-
28	408381	-	y	-	<7	y	2	y	y	2	-	n	y	-	-	-	-	-	-
29	999774	-	y	-	>7	-	2	y	-	-	-	n	-	-	-	-	-	-	-
30	1027876	Y	-	y	>7	-	2	y	-	-	-	n	-	-	-	-	-	-	-
31	1007803	-	y	-	>7	-	2	y	-	-	-	n	-	-	-	-	-	-	-
32	1054345	y	y	-	<7	-	2	y	-	-	-	n	y	y	y	-	-	-	-
33	1007803	-	y	-	>7	-	1	y	-	-	-	n	-	-	-	-	-	-	-
34	1034139	-	y	-	<7	y	-	y	-	-	-	n	-	-	-	-	-	-	-
35	1083562	y	y	-	<7	y	-	y	-	-	y	-	y	y	y	-	-	-	-
36	1111596	y	y	-	<7	y	-	y	-	-	-	n	-	-	-	-	-	-	-
37	999774	-	y	-	<7	-	2	y	y	1	-	n	y	-	-	-	-	-	-
38	1051603	-	y	-	>7	y	-	y	-	-	-	n	-	-	-	-	-	-	-
39	1115760	y	y	-	>7	-	2	y	-	-	-	n	y	y	y	-	y	-	-
40	1111596	y	y	-	<7	y	-	y	y	2	-	n	y	-	-	-	-	-	-
41	1083562	y	y	-	>7	-	2	y	-	-	-	n	-	-	-	-	-	-	-
42	930891	-	-	y	>7	-	2	n	-	-	-	n	-	-	-	-	-	-	-
43	1123830	-	y	-	<7	y	-	y	-	-	-	n	-	-	-	-	-	-	-
44	1009172	-	y	-	>7	y	-	y	y	2	-	n	y	-	-	-	y	-	y
45	1075035	-	y	-	<7	-	2	y	y	1	-	n	y	y	y	-	-	-	-
46	1073267	y	y	-	<7	y	-	n	-	-	-	n	-	-	-	-	-	-	-
47	932574	y	-	y	>7	y	-	y	-	-	-	n	-	-	-	-	-	-	-
48	867814	-	-	y	>7	y	-	n	-	-	-	n	-	-	-	-	-	-	-
49	924163	y	-	y	>7	y	-	y	-	-	-	n	y	y	-	y	y	-	-
50	1116685	-	-	y	<7	-	2	y	-	-	-	n	y	-	-	-	y	-	-
51	992452	-	-	y	>7	-	1	n	-	-	-	n	y	y	y	-	-	-	-
52	1027876	y	y	-	>7	-	2	n	-	-	-	n	-	-	-	-	-	-	-
53	1149579	y	y	-	>7	-	1	y	-	-	-	n	-	-	-	-	-	-	-
54	1152070	y	y	-	>7	-	2	y	-	-	-	n	y	y	y	-	-	-	-
55	1073267	y	y	-	<7	y	2	n	-	-	-	n	y	y	y	-	-	-	-
56	1140002	y	y	-	>7	y	2	y	-	-	-	n	-	-	-	-	-	-	-
57	1141514	-	y	-	>7	-	2	y	-	-	-	n	-	-	-	-	-	-	-
58	1197282	-	y	-	>7	y	-	y	-	-	-	n	-	-	-	-	-	-	-
59	1114766	-	y	-	>7	-	2	y	-	-	-	n	-	-	-	-	-	-	-
60	1034748	-	y	-	>7	-	2	y	-	-	-	n	-	-	-	-	-	-	-
61	1123830	-	-	y	>7	-	2	y	-	-	-	n	-	-	-	-	-	-	-
62	1227585	y	y	-	<7	-	2	y	-	-	-	n	y	y	y	-	-	-	-
63	1099662	-	-	y	>7	-	2	n	-	-	-	n	-	-	-	-	-	-	-

Sr. No	MRD NO	Non bloody_At presentation	Non bloody_During hospital stay	Respiratory symptoms	Cough	Cough At presentation	Cough During hospital stay	Distress	Distress At presentation	Distress During hospital stay	Urinary complaints	UTI	UTI At presentation	UTI During hospital stay	Oliguria /anuria	Oliguria/ anuria At presentation	Oliguria/ anuria During hospital stay	CVS symptoms	Palpitations	Palpitations At presentation	Palpitations During hospital stay
1	934745	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2	1004593	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3	967918	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4	930891	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5	1001038	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6	1012023	y	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7	978832	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8	1007143	-	y	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9	988999	-	-	y	-	-	-	y	-	y	-	-	-	-	-	-	-	-	-	-	-
10	1007803	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11	968727	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12	1054345	-	-	y	y	-	y	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13	1027876	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
14	934745	-	-	y	y	y	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
15	930891	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16	1026634	-	-	y	y	y	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
17	1047635	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18	1060418	y	-	-	-	-	-	-	-	-	y	y	y	-	-	-	-	-	-	-	-
19	968429	y	-	y	y	y	-	y	y	-	y	y	-	y	-	-	-	-	-	-	-
20	978832	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
21	986585	-	y	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
22	980697	y	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
23	986965	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
24	1099577	y	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
25	1001038	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
26	1083562	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
27	988999	y	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
28	408381	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
29	999774	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
30	1027876	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
31	1007803	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
32	1054345	-	-	y	-	-	-	y	-	y	-	-	-	-	-	-	-	-	-	-	-
33	1007803	-	-	y	y	y	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
34	1034139	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
35	1083562	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
36	1111596	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
37	999774	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
38	1051603	-	-	y	y	-	y	-	-	-	-	-	-	-	-	-	-	-	-	-	-
39	1115760	y	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
40	1111596	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
41	1083562	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
42	930891	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43	1123830	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
44	1009172	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
45	1075035	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
46	1073267	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
47	932574	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
48	867814	-	-	y	y	-	y	y	-	y	-	-	-	-	-	-	-	-	-	-	-
49	924163	-	y	y	y	-	y	-	-	-	-	-	-	-	-	-	-	-	-	-	-
50	1116685	y	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
51	992452	-	-	y	y	y	-	-	-	-	y	-	-	-	y	y	-	-	-	-	-
52	1027876	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
53	1149579	-	-	y	y	y	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
54	1152070	-	-	y	y	y	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
55	1073267	-	-	y	y	y	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
56	1140002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
57	1141514	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
58	1197282	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
59	1114766	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
60	1034748	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
61	1123830	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
62	1227585	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
63	1099662	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Sr. No	MRD NO	Breathlessness	Breathlessness At presentation	Breathlessness During hospital stay	CNS symptoms	Seizures	Seizures At presentation	Seizures During hospital stay	Altered Sensorium	Altered Sensorium At presentation	Altered Sensorium During hospital stay	Musculo-skeletal symptoms	Myalgias	Myalgias At presentation	Myalgias During hospital stay	Bony pains	Bony pains At presentation	Bony pains During hospital stay	Others	Tachycardia
1	934745	-	-	-	-	-	-	-	-	-	-	y	y	y	-	-	-	-	-	-
2	1004593	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3	967918	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4	930891	-	-	-	-	-	-	-	-	-	-	y	y	y	-	-	-	-	-	-
5	1001038	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6	1012023	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7	978832	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8	1007143	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9	988999	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	y
10	1007803	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11	968727	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12	1054345	-	-	-	-	-	-	-	-	-	-	y	y	-	y	-	-	-	-	-
13	1027876	-	-	-	-	-	-	-	-	-	-	y	y	y	-	-	-	-	-	-
14	934745	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
15	930891	-	-	-	-	-	-	-	-	-	-	y	y	y	-	-	-	-	-	-
16	1026634	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
17	1047635	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	y
18	1060418	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	y
19	968429	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	y
20	978832	-	-	-	-	-	-	-	-	-	-	y	y	y	-	-	-	-	-	-
21	986585	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	y
22	980697	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
23	986965	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
24	1099577	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	y
25	1001038	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	y
26	1083562	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	y
27	988999	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	y
28	408381	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
29	999774	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
30	1027876	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
31	1007803	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
32	1054345	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	y
33	1007803	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
34	1034139	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
35	1083562	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
36	1111596	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
37	999774	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
38	1051603	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
39	1115760	-	-	-	y	-	-	y	-	-	-	-	-	-	-	-	-	-	-	y
40	1111596	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
41	1083562	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
42	930891	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43	1123830	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
44	1009172	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
45	1075035	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
46	1073267	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
47	932574	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
48	867814	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
49	924163	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
50	1116685	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	y
51	992452	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
52	1027876	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	y
53	1149579	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
54	1152070	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	y
55	1073267	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	y
56	1140002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
57	1141514	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
58	1197282	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Pain left eye	-
59	1114766	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
60	1034748	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
61	1123830	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
62	1227585	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
63	1099662	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Sr. No	MRD NO	Tachycardia At presentation	Tachycardia During hospital stay	Tachypnea	Tachypnea At presentation	Tachypnea During hospital stay	Hypotension	Hypotension At presentation	Hypotension During hospital stay	De-saturation (<90%)	De-saturation (<90%) At presentation	De-saturation (<90%) During hospital stay	Prolonged CFT (>2sec)	Prolonged CFT (>2sec) At presentation	Prolonged CFT (>2sec) During hospital stay	TLC (103/uL) Day of admission	TLC (103/uL) Day of discharge	DLC-N (%) Day of admission	DLC-L (%) Day of admission
1	934745	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.6	1.8	63	24
2	1004593	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1	0.2	4	1
3	967918	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.7	2	3	1
4	930891	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.4	1.2	3	7
5	1001038	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.6	1.7	3	7
6	1012023	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.3	0.8	14	80
7	978832	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.2	3.1	1	4
8	1007143	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.1	3.6	37	54
9	988999	-	y	y	-	y	y	-	y	y	-	y	-	-	-	1	3.2	17	79
10	1007803	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.6	1	2	3
11	968727	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.5	1.6	2	3
12	1054345	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.6	1.2	1	4
13	1027876	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	3.2	76	19
14	934745	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.6	5	6	3
15	930891	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.5	1.2	37	54
16	1026634	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1.2	7	86
17	1047635	y	-	-	-	-	y	y	-	-	-	-	-	-	-	0.2	0.2	1	4
18	1060418	-	y	y	-	y	-	-	-	-	-	-	-	-	-	0.4	1.8	3	6
19	968429	y	-	y	y	-	y	y	-	y	y	-	y	y	-	0.1	3.1	1	4
20	978832	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.3	0.5	4	6
21	986585	-	y	y	-	y	y	-	y	y	-	y	y	-	y	0.2	2.9	2	3
22	980697	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.9	2.3	3	2
23	986965	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.5	1.2	1	4
24	1099577	y	-	-	-	-	-	-	-	-	-	-	-	-	-	3.3	1.8	80	18
25	1001038	y	-	-	-	-	-	-	-	-	-	-	-	-	-	0.3	5.1	2	3
26	1083562	y	-	y	y	-	y	y	-	y	y	-	y	y	-	0.7	2	35	54
27	988999	y	-	-	-	-	-	-	-	-	-	-	-	-	-	1.5	8	30	65
28	408381	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.4	3.5	2	8
29	999774	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.8	2.3	7	80
30	1027876	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.4	2.4	1	9
31	1007803	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.9	0.7	4	84
32	1054345	-	y	y	-	y	y	-	y	y	-	y	-	-	-	0.1	0.1	1	9
33	1007803	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.8	1.7	57	29
34	1034139	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.3	1.3	13	60
35	1083562	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.4	1.6	2	6
36	1111596	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.8	1.5	11	83
37	999774	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.7	1.3	21	65
38	1051603	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.4	1.3	4	6
39	1115760	y	-	y	y	-	y	y	-	y	y	-	y	y	-	1.3	3	10	87
40	1111596	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.9	1.8	1	23
41	1083562	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.8	2	2	6
42	930891	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.1	2.3	31	52
43	1123830	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.3	0.3	2	3
44	1009172	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.3	1.2	1	4
45	1075035	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.7	1.8	64	23
46	1073267	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.9	1	81	11
47	932574	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.4	2	2	3
48	867814	-	-	y	y	-	-	-	-	y	-	y	-	-	-	2	4.2	82	4
49	924163	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1	1.6	2	3
50	1116685	y	-	y	y	-	y	y	-	-	-	-	-	-	-	2.2	1.1	55	30
51	992452	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8.9	2.6	66	21
52	1027876	-	y	-	-	-	-	-	-	-	-	-	-	-	-	1.3	0.9	30	60
53	1149579	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.4	1	58	28
54	1152070	y	-	-	-	-	-	-	-	-	-	-	-	-	-	10.8	6.8	76	5
55	1073267	y	-	y	y	-	-	-	-	-	-	-	-	-	-	0.3	0.7	1	4
56	1140002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9.4	6.5	68	21
57	1141514	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10.3	2.7	77	15
58	1197282	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.3	3	82	14
59	1114766	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.8	2.4	27	47
60	1034748	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.7	1.9	35	58
61	1123830	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.6	1.1	38	50
62	1227585	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.5	3.6	55	35
63	1099662	-	-	y	-	y	-	-	-	-	-	-	-	-	-	0.7	1.2	20	70

Sr. No	MRD NO	DLC-N (%) Day of discharge	DLC-L (%) Day of discharge	ANC (per mm3) Day of admission	ANC (per mm3) Day of discharge	Grade of neutropenia	Day 3	Day 5	Day 7	Day 9	Day 11	Day 13	Duration of neutropenia (<500/mm3)	Platelets (103/uL) Day of admission	Platelets (103/uL) Day of discharge	MPV (fL) Day of admission	MPV (fL) Day of discharge	Hb (gm/dl) Day of admission	Hb (gm/dl) Day of discharge	RBC count (106/uL) Day of admission	RBC count (106/uL) Day of discharge	PCV (%) Day of admission	PCV (%) Day of discharge	MCV (fL) Day of admission
1	934745	75	19	378	1350	4	4	3	2	0	0	0	4	22	32	9.1	9	7.7	10	2.65	3.49	23.3	31.2	87.8
2	1004593	2	7	4	4	4	4	4	4	4	0	0	9	11	564	7.8	8	8.2	10.2	2.95	3.79	26	34.4	88.2
3	967918	31	41	21	620	4	3	0	0	0	0	0	2	88	100	11.6	10	8.3	12	3.08	3.85	25.7	32	83.4
4	930891	22	65	12	264	4	4	4	0	0	0	0	6	120	424	10.9	8.9	8.8	8.2	3.04	3.09	27.5	27.4	90.4
5	1001038	65	23	18	1105	4	3	2	2	0	0	0	3	121	615	8.6	7.8	6.5	14.4	2.24	4.44	19.6	41	87.7
6	1012023	2	7	42	16	4	4	4	4	4	0	0	9	151	28	7.9	9.6	8.8	7.8	3.6	3.12	28.2	24.9	78.2
7	978832	61	26	2	1891	4	4	4	1	0	0	0	6	10	18	7.7	9.1	6.8	8.4	2.36	2.97	20.5	26.1	86.9
8	1007143	28	60	407	1008	4	4	4	4	2	0	0	12	34	836	12.7	8.1	10.1	13.6	3.26	3.97	29.9	38.4	91.9
9	988999	39	49	170	1248	4	4	4	4	2	0	0	7	168	48	7.9	11.2	5.5	7.7	1.66	2.25	17.2	22.4	103.5
10	1007803	4	4	12	4	4	4	4	0	0	0	0	6	54	28	8.6	9.1	8	10.3	2.92	3.73	24.2	31.2	82.8
11	968727	33	55	10	528	4	4	4	4	3	0	0	7	48	70	10.4	10.4	8.4	9.4	2.96	3.66	25.4	29.9	85.9
12	1054345	40	50	6	480	4	4	4	4	0	0	0	7	12	40	9.3	8.1	6.3	8.8	2.35	3.27	19	27.2	80.8
13	1027876	16	70	760	512	3	4	4	4	4	3	0	9	54	110	9.7	9.6	6.8	10.8	2.36	3.47	20.4	32.1	86.5
14	934745	80	6	36	4000	4	4	1	0	0	0	0	4	10	6	8.5	10.1	5.9	8.6	1.87	2.66	17.9	25.6	95.7
15	930891	14	78	185	168	4	4	4	0	0	0	0	5	102	160	9.9	11.3	9.3	9.7	3.22	3.15	29.5	29.1	91.6
16	1026634	4	6	70	48	4	4	4	0	0	0	0	5	10	14	9.5	10.5	7.5	10.2	3.88	3.74	31.7	30.8	91.8
17	1047635	8	12	2	16	4	4	4	4	0	0	0	7	8	32	7.1	8.8	8.9	9.9	3.17	3.61	26.5	29.9	83.8
18	1060418	40	47	12	720	4	4	4	4	3	0	0	7	178	619	9.2	8.3	7.9	11.8	3.39	4.78	25	37.7	73.7
19	968429	47	42	1	1457	4	4	4	3	3	3	3	6	22	10	9.9	8.6	10.5	8.1	3.67	3.01	31.4	25.9	85.7
20	978832	8	1	12	40	4	4	4	0	0	0	0	6	22	18	9.1	10.5	7.2	7.5	2.48	2.53	23	23	92.8
21	986585	58	28	4	1682	4	4	4	4	0	0	0	8	70	194	7.9	8.5	7.7	9.3	2.59	3.68	23.7	29.1	91.3
22	980697	50	38	27	1150	4	3	2	0	0	0	0	2	140	184	8.3	8.3	8.2	11.7	2.94	3.94	25.3	35.9	86
23	986965	50	35	5	600	4	3	0	0	0	0	0	2	161	180	7.3	8.8	7.3	7.7	2.61	2.81	21.6	24.4	82.9
24	1099577	30	57	2640	540	4	4	4	4	4	3	0	11	203	413	8.7	6.5	8.7	8.5	3.33	3.14	27.2	26.4	81.6
25	1001038	74	14	6	3774	4	4	4	0	0	0	0	5	6	44	8	9.3	6.3	9.3	2.31	3.33	19.9	29.3	85.9
26	1083562	52	36	245	1040	4	4	4	3	2	0	0	6	266	368	9	8.1	7.3	9.5	3.89	4.28	25.2	31.3	64.8
27	988999	49	34	450	3920	4	3	0	0	0	0	0	3	231	98	9	8.7	9.2	8.5	2.98	2.62	27.9	26.2	93.6
28	408381	35	53	8	1225	4	4	2	2	0	0	0	6	40	125	7.9	9	7.9	11.5	2.41	3.87	23.7	35.7	98.2
29	999774	40	48	126	920	4	4	3	3	0	0	0	4	30	80	10.6	11.1	8.5	8.6	3.11	3.12	25.8	26.9	83
30	1027876	47	40	4	1128	4	4	3	2	0	0	0	4	16	300	11.2	9.4	8.6	9.7	3.42	3.48	26.4	29.4	77
31	1007803	2	8	36	14	4	4	4	0	0	0	0	5	112	62	8.9	10.1	9.9	8.9	3.45	3.12	30.1	27.2	87.3
32	1054345	1	3	1	1	4	4	4	0	0	0	0	5	16	10	10.4	11.5	9.3	9	3.37	3.41	27.1	27.3	80.3
33	1007803	38	52	1026	646	2	0	4	4	4	3	0	6	285	72	8.3	8.8	8.8	10	3.11	3.16	27.7	30.3	88.9
34	1034139	13	70	169	169	4	4	0	0	0	0	0	3	140	132	8.6	8.9	13.4	13.4	4.75	4.45	40.7	37.8	85.6
35	1083562	48	43	8	768	4	4	4	3	3	0	0	5	369	214	8.4	7.7	8.2	9.2	3.07	3.42	24.9	28.1	81
36	1111596	30	68	88	450	4	3	4	3	4	0	0	2	655	56	6.4	6.6	8.8	8.3	3.02	2.85	26.2	24.3	86.8
37	999774	27	59	147	351	4	4	4	0	0	0	0	5	78	60	13.9	12.2	7.2	8.9	2.44	2.96	21.8	26.3	89.4
38	1051603	46	41	16	598	4	4	4	4	4	3	0	11	10	561	8	7.5	7	9.4	2.42	3.38	20.4	27.6	84.4
39	1115760	74	24	13	2220	4	4	4	4	1	1	0	8	18	106	11.2	10.6	16.1	9.1	5.72	3.25	48.2	26.8	84.3
40	1111596	19	69	9	342	4	4	4	4	0	0	0	8	11	172	7.5	6.5	7.9	8.7	2.71	3.16	23	26.9	85
41	1083562	45	42	16	900	4	4	4	4	3	0	0	8	90	604	8.5	8.8	8.4	8.7	3.17	3.28	26	28	82.2
42	930891	36	49	341	828	4	3	3	0	0	0	0	2	151	252	11.7	12.3	8	9	2.75	3.31	24.3	28.8	88.5
43	1123830	1	3	6	3	4	4	4	4	0	0	0	7	22	150	9.4	8	9.3	8.3	3.09	2.76	28	25.1	90.4
44	1009172	37	50	3	481	4	4	4	0	0	0	0	4	40	24	8.6	9.3	10.4	8.1	4.05	3.17	33	25.5	81.3
45	1075035	60	30	448	1080	4	3	2	0	0	0	0	5	90	233	13.6	9.6	6.1	6.7	2.04	2.37	19.1	21.9	93.3
46	1073267	38	47	729	380	3	4	4	0	0	0	0	5	282	287	9.8	9.6	7.4	7.5	2.45	2.41	23.3	23.2	94.8
47	932574	15	75	8	300	4	4	4	4	4	4	0	12	6	158	8.1	8.5	5.7	8.2	1.91	2.88	17	24.1	88.8
48	867814	69	21	1640	2898	1	4	4	1	1	0	0	5	60	573	10.7	8.8	12.9	12.2	4.12	3.73	40.1	36.1	97.3
49	924163	32	48	2	502	4	4	4	4	4	3	0	10	8	78	6.5	9.2	9.1	9.2	3.53	3.29	27.6	26.7	78.4
50	1116685	40	41	1210	440	2	2	3	4	4	4	4	14	230	344	6.8	7.2	8.7	7.3	3.04	2.49	26	21.9	85.8
51	992452	55	26	1914	1430	1	1	2	0	0	0	0	5	226	364	7.4	6.4	13.2	12.7	4.43	4.17	39.3	36.7	88.7
52	1027876	20	70	390	180	4	4	4	4	4	4	4	14	94	60	10.4	9.9	9.7	8.9	3.23	3.03	29.1	26.2	90.1
53	1149579	43	38	812	430	3	4	3	4	0	0	0	7	80	45	10.2	9.8	9.7	7.4	3.18	2.45	29	21.8	91.2
54	1152070	73	15	7600	4964	4	4	4	3	2	1	0	11	304	265	9.5	9	9	7.3	3.51	2.89	26.6	21.8	75.7
55	1073267	2	7	3	14	4	4	4	0	0	0	0	3	84	70	10.8	10.6	10.1	8.5	2.67	2.49	30.9	27	115.7
56	1140002	66	20	6392	4225	1	1	1	0	0	0	0	1	302	100	8.7	9.3	11.5	9.4	3.93	3.29	33.7	28.7	85.9
57	1141514	41	47	7700	1107	1	4	1	0	0	0	0	1	518	403	7.9	7.7	10.9	10.4	4.04	3.93	33.2	31.9	82.2
58	1197282	44	43	1066	1320	3	3	4	4	4	3	2	6	80	114	9.1	7.8	9.6	12.1	3.51	4.62	30.1	39.5	85.7
59	1114766	38	49	756	912	3	3	4	3	0	0	0	2	100	179	8.1	8.5	10	9.1	3.71	3.33	30.2	27.9	81.5
60	1034748	14	74	245	266	4	4	4	4	0	0	0	7	144	240	9.6	9.6	8.8	10.3	2.93	3.42	28.1	32.6	96
61	1123830	30	60	228	330	4	4	4	0	0	0	0	5	150	164	7.2	7.7	8.1	6.8	2.82	2.47	23.8	21	84.3
62	1227585	76	17	275	2736	4	4	1	0	0	0	0	3	254	130	8.3	8.9	10.3	8.5	4.6	3.8	33.3	28.2	72.3
63	1099662	40	50	140	480	4	4	4	4	0	0	0	7	15	31	7.7	9.1	8.2	9.6	2.73	3.39	24.4	28.8	89.4

Sr. No	MRD NO	MCV (fL) Day of discharge	MCH (Pg) Day of admission	MCH (Pg) Day of discharge	MCHC (gm/dl) Day of admission	MCHC (gm/dl) Day of discharge	RDW (%) Day of admission	RDW (%) Day of discharge	PCT (ng/ml) Day 1	PCT (ng/ml) Day 3	PCT (ng/ml) Day 5	PCT (ng/ml) Day 7	PCT (ng/ml) Day 9	PCT (ng/ml) Day 11	PCT (ng/ml) Day 13	CRP (mg/lt) Day 1	CRP (mg/lt) Day 3	CRP (mg/lt) Day 5	CRP (mg/lt) Day 7	CRP (mg/lt) Day 9	CRP (mg/lt) Day 11	CRP (mg/lt) Day 13	Urea (mg/dl) Day of admission	Urea (mg/dl) Day of discharge	Creatinine (mg/dl) Day of admission	Creatinine (mg/dl) Day of discharge
1	934745	89.4	29.1	28.6	33.1	31.9	21.1	19.1	0.27	-	-	-	-	-	-	11.71	-	-	-	-	-	-	20	-	0.33	-
2	1004593	90.8	27.7	27	31.4	29.7	17.2	15.4	0.2	-	-	-	-	-	-	73.5	-	-	-	-	-	-	9	-	0.17	-
3	967918	83	27	31	32.4	37.4	18.9	18.9	16.53	-	-	-	-	-	-	60.54	-	-	-	-	-	-	21	-	0.32	-
4	930891	88.6	28.9	26.4	32	29.8	24.5	25.9	0.08	-	-	-	-	-	-	17.62	-	-	-	-	-	-	16	-	0.66	-
5	1001038	92.3	29	32.5	33.1	35.2	16.6	17	1.2	-	-	-	-	-	-	54.16	-	-	4.85	-	-	-	25	-	0.23	-
6	1012023	79.6	24.5	25	31.3	31.4	21.3	20.6	0.35	-	-	-	-	-	-	56.06	-	-	-	-	-	-	12	-	0.31	-
7	978832	88.1	28.7	28.3	33	32.1	18	16.8	0.07	-	-	-	-	-	-	59.3	-	-	-	-	-	-	5	-	0.34	-
8	1007143	91.6	30.9	32.4	33.7	35.3	19.3	19.1	0.21	-	-	-	-	-	-	0.62	-	-	-	-	-	-	-	-	-	-
9	988999	99.8	32.9	34.3	31.8	34.3	17.2	16.7	0.03	-	-	-	-	-	-	159.1	-	260.8	-	-	-	-	10	-	0.22	-
10	1007803	83.8	27.5	27.5	33.2	32.8	15.4	13.7	0.12	-	-	-	-	-	-	40.81	-	-	-	-	-	-	19	-	0.26	-
11	968727	81.8	28.3	25.9	32.9	31.6	19.6	17.6	0.41	-	0.28	-	-	-	-	53.27	-	61.26	-	-	-	-	16	-	0.21	-
12	1054345	83.1	26.8	27	33.2	32.5	15	15.7	0.2	-	-	-	-	-	-	24.68	-	52.62	-	-	-	-	20	8	0.38	0.29
13	1027876	92.3	28.8	31	33.3	33.6	15	15.3	0.2	-	-	-	-	-	-	1.07	-	-	-	-	9.28	-	29	21	0.24	0.34
14	934745	96.2	31.8	32.4	33.2	33.6	18.4	16.1	0.25	-	-	-	-	-	-	8.99	-	-	-	-	-	-	16	-	0.19	-
15	930891	92.5	28.8	30.8	31.4	33.3	21.5	20	0.07	-	-	-	-	-	-	26.93	-	-	-	-	-	-	21	-	0.65	-
16	1026634	82.3	28.2	27.3	30.8	33	15.4	14.6	1.27	-	-	-	-	-	-	7.51	-	-	-	-	-	-	12	-	0.12	-
17	1047635	82.8	28.1	27.4	33.5	33.1	13.6	15.8	0.2	-	-	-	-	-	-	23.09	-	95	-	-	-	-	17	9	0.37	0.41
18	1060418	79	23.3	24.7	31.6	31.3	14.5	17.6	0.2	-	-	-	-	-	-	29.53	-	-	-	-	-	-	6	-	0.16	-
19	968429	86	28.8	27	33.6	31.4	18	10	101	-	56.19	-	-	-	-	148.12	-	231.07	-	-	-	-	48	78	0.52	0.26
20	978832	91.2	29	29.8	31.3	32.7	17.4	16.4	0.11	-	-	-	-	-	-	43.81	100.95	52.18	-	-	-	-	13	-	0.46	-
21	986585	79.2	29.6	25.4	32.4	32	15.9	27.3	33.8	-	18.1	-	-	-	-	11.99	165.97	-	-	-	-	-	32	6	0.47	0.07
22	980697	91.1	27.7	29.8	32.2	32.7	11.8	13.2	0.73	-	-	-	-	-	-	12.01	-	-	-	-	-	-	16	-	0.28	-
23	986965	86.7	27.9	27.5	33.7	31.8	14.5	12.6	0.15	-	-	-	-	-	-	1.26	-	-	-	-	-	-	28	-	0.12	-
24	1099577	84.3	26.2	27.1	32.2	32.2	15.5	15.9	0.13	-	-	-	-	-	-	1.12	74.37	31.8	-	-	-	-	18	-	0.35	-
25	1001038	87.9	27.4	27.9	31.9	31.8	20.4	17.9	42.96	-	-	-	-	-	-	256.6	-	-	-	-	-	-	21	-	0.29	-
26	1083562	73.1	18.8	22.1	29	30.2	23.1	24	0.08	-	0.31	-	-	-	-	13.49	26.32	145.69	-	-	-	-	21	-	0.3	-
27	988999	99.7	30.9	32.5	33	32.6	23	24	0.78	-	-	-	-	-	-	46.76	18.4	9.9	-	-	-	-	32	-	0.22	-
28	408381	92.3	32.6	29.8	33.2	32.3	18.5	23.9	0.11	-	-	-	-	-	-	39.5	-	-	-	-	-	-	21	6	0.17	0.1
29	999774	85.9	27.4	27.4	33.1	31.9	13.3	15.4	0.15	-	-	-	-	-	-	41.26	-	-	-	-	-	-	16	-	0.28	-
30	1027876	84.5	25.1	27.9	32.6	33	23.3	27.3	0.08	-	0.09	-	-	-	-	1	-	15.58	-	-	-	-	7	-	0.25	-
31	1007803	87.3	28.8	28.6	33	32.8	16.8	16.8	1.2	-	-	-	-	-	-	20.81	-	-	-	-	-	-	-	-	-	-
32	1054345	80.2	27.5	26.4	34.2	33	15.7	18.9	0.6	-	-	-	-	-	-	66.71	-	-	-	-	-	-	16	15	0.41	0.46
33	1007803	96.1	28.4	31.6	32	32.9	20.9	20.6	2.8	-	-	-	-	-	-	25.27	-	-	-	-	-	-	-	-	-	-
34	1034139	84.9	28.2	30.1	33	35.4	14.1	13.7	0.12	-	-	-	-	-	-	0.74	-	-	-	-	-	-	-	-	-	-
35	1083562	82.1	26.5	26.8	32.8	32.7	22.4	19	0.33	-	-	-	-	-	-	47.1	-	-	-	-	-	-	-	-	-	-
36	1111596	85.2	29.1	29.1	33.5	34.2	14.4	13.9	0.04	-	-	-	-	-	-	1.08	-	-	-	-	-	-	-	-	-	-
37	999774	88.8	29.4	29.9	32.8	33.7	15.9	15.3	0.03	-	-	-	-	-	-	5.31	-	-	-	-	-	-	15	-	0.43	-
38	1051603	81.7	28.8	27.8	34.1	34	12.7	21.4	0.06	-	-	-	-	-	-	39.69	-	-	-	-	-	-	-	-	-	-
39	1115760	82.5	28.1	28.1	33.4	34	16.6	15.3	1.48	93.7	-	-	-	-	-	4.35	344.3	130.71	-	-	-	-	28	23	0.32	0.12
40	1111596	85	29	27.5	34.1	32.3	14.2	13.6	0.07	-	-	-	-	-	-	4.36	-	-	-	-	-	-	21	-	0.29	-
41	1083562	85.2	26.3	26.4	32.1	31	15.9	15	0.19	-	0.11	-	-	-	-	38.69	-	36.73	-	-	-	-	-	-	-	-
42	930891	86.8	29.1	27.1	32.9	31.2	18.1	19.5	0.03	-	-	-	-	-	-	58.11	-	-	-	-	-	-	12	-	0.66	-
43	1123830	91	30	30.1	33.2	33.1	16	15.6	0.15	-	-	-	-	-	-	4.75	-	-	-	-	-	-	-	-	-	-
44	1009172	80.6	25.6	25.6	31.5	31.8	15.7	16	1.69	-	-	-	-	-	-	179.61	-	-	-	-	-	-	-	-	-	-
45	1075035	92.5	29.8	28.3	31.9	30.6	19.8	19.4	0.13	-	-	-	-	-	-	17.41	-	-	-	-	-	-	-	-	-	-
46	1073267	96.3	30	31.3	31.7	32.5	20.3	21.8	0.05	-	-	-	-	-	-	5.64	-	-	-	-	-	-	26	-	0.21	-
47	932574	83.5	29.6	28.6	33.3	34.2	21.1	14.5	0.29	-	-	-	-	-	-	33.99	-	142.3	-	143.8	-	-	18	-	0.23	-
48	867814	96.7	31.4	32.6	32.3	33.7	16.6	18.5	0.16	-	0.1	-	-	-	-	0.21	-	19.6	-	3.99	-	-	15	13	0.34	0.3
49	924163	81.2	25.8	27.9	32.9	34.3	19.9	18.1	0.58	-	-	-	-	-	-	72.65	-	200.28	-	91.54	-	-	25	13	0.3	0.24
50	1116685	87.8	28.7	29.4	33.4	33.5	14.3	19	7.2	-	0.37	-	-	-	-	158.86	-	-	-	133.56	-	-	32	9	0.24	0.18
51	992452	88	29.9	30.5	33.7	34.7	15.4	15.5	4.23	-	-	-	-	-	-	0.55	-	0.6	-	-	-	-	15	-	0.23	-
52	1027876	86.4	30	29.3	33.4	33.9	16.4	15.7	0.14	-	0.44	-	0.22	-	-	16.2	-	37.9	-	93.05	-	-	19	22	0.34	0.28
53	1149579	89.1	30.4	30.3	33.4	34	18.7	17.9	0.35	-	11.56	-	-	-	-	14.47	-	60.55	-	-	-	-	13	10	0.29	0.26
54	1152070	75.4	25.7	25.1	34	33.2	25.8	26.1	0.79	-	-	-	-	-	-	51.28	-	-	-	-	-	-	18	-	0.2	-
55	1073267	108	37.8	34.1	32.6	31.4	16.8	16.9	1.46	-	-	-	-	-	-	36.42	-	-	-	-	-	-	32	-	0.37	-
56	1140002	87.2	29.3	28.5	34	32.6	14.4	15.6	0.2	-	3.65	-	-	-	-	20.91	-	75.73	-	-	-	-	15	-	0.21	-
57	1141514	81	26.9	26.5	32.8	32.7	19.9	19.7	0.15	-	0.04	-	-	-	-	59.01	-	30.26	-	-	-	-	24	-	0.28	-
58	1197282	85.6	27.3	26.3	31.8	30.7	17.2	16.5	1.6	-	0.69	-	-	-	-	59.63	-	80.67	-	-	-	-	14	7	0.14	0.14
59	1114766	83.6	27.1	27.2	33.2	32.6	14.8	15.5	0.26	-	-	-	-	-	-	36.92	-	-	-	-	-	-	17	-	0.44	-
60	1034748	95.2	29.9	30	31.2	31.5	17	18.9	0.81	-	2.29	-	-	-	-	35.21	-	10.22	-	-	-	-	19	-	0.4	-
61	1123830	84.9	28.8	27.6	34.1	32.5	13.6	14.1	0.22	-	-	-	-	-	-	4.73	-	-	-	-	-	-	16	-	0.26	-
62	1227585	72.5	22.4	21.9	30.9	30.1	15.5	15.5	0.19	-	-	-	-	-	-	78.41	-	-	-	-	-	-	21	-	0.26	-
63	1099662	85	30	28.4	33.5	33.3	13.3	13.2	0.4	-	-	-	-	-	-	12.35	-	-	-	-	-	-	19	-	0.31	-

Sr. No	MRD NO	Na Day of admission	K Day of admission	CL Day of admission	Na Day of discharge	K Day of discharge	CL Day of discharge	T.BIL Day of admission	D.BIL (mg/dl) Day of admission	T.BIL (mg/dl) Day of discharge	D.BIL (mg/dl) Day of discharge	SGOT Day of admission	SGPT (U/L) Day of admission	SGOT(U/L) Day of discharge	SGPT (U/L) Day of discharge	ALP (U/L) Day of admission	ALP (U/L) Day of discharge	T.Proteins (g/dl) Day of admission	T.Proteins (g/dl) Day of discharge	S.Albumin (g/dl) Day of admission	S.Albumin (g/dl) Day of discharge
1	934745	133	3.93	96	-	-	-	0.84	0.35	-	-	234	138	-	-	330	-	7.6	-	4.19	-
2	1004593	135	4.03	101	-	-	-	1.01	0.22	-	-	30	151	-	-	145	-	6.3	-	4.34	-
3	967918	140	4.58	106	-	-	-	0.35	0.12	-	-	32	20	-	-	138	-	6.1	-	4.12	-
4	930891	138	4.1	99	-	-	-	0.78	0.31	-	-	29	24	-	-	69	-	6.8	-	4.26	-
5	1001038	135	3.94	100	-	-	-	0.78	0.19	-	-	28	19	-	-	70	-	61	-	4.05	-
6	1012023	133	3.77	97	-	-	-	0.57	0.27	-	-	19	35	-	-	79	-	6.9	-	4.13	-
7	978832	138	3.31	105	-	-	-	0.79	0.12	-	-	27	31	-	-	108	-	6.7	-	4.09	-
8	1007143	138	3.99	105	-	-	-	0.86	0.23	-	-	34	56	-	-	110	-	5	-	3.81	-
9	988999	141	2.31	107	-	-	-	-	-	-	-		8	-	-	-	-	-	-	-	-
10	1007803	135	3.83	109	-	-	-	0.65	0.19	-	-	29	52	-	-	119	-	6.2	-	4.42	-
11	968727	137	3.75	101	-	-	-	1.32	0.75	-	-	54	130	-	-	140	-	5.1	-	3.49	-
12	1054345	135	3.62	99	137	3.68	102	0.53	0.32	0.8	0.27	20	81	20	59	191	249	5.2	5.5	3.76	3.52
13	1027876	133	4.43	101	138	4.21	104	1.46	0.48	0.98	0.29	28	22	39	40	339	274	6.5	7.3	4.22	4.77
14	934745	137	3.41	103	-	-	-	0.49	0.22	-	-	120	59	-	-	317	-	6.7	-	3.96	-
15	930891	135	3.41	98	-	-	-	0.86	0.24	-	-	32	28	-	-	51	-	6.7	-	4.3	-
16	1026634	136	4.11	101	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
17	1047635	132	3.66	101	136	2.96	106	0.78	0.24	0.54	0.23	19	17	16	17	78	81	7.5	6.1	3.87	2.87
18	1060418	136	2.38	103	-	-	-	0.31	0.09	-	-	28	63	-	-	119	-	5.8	-	3.76	-
19	968429	130	3.8	99	164	3.01	123	0.95	0.44	2.11	1.29	65	105	75	44	125	65	4.5	3.7	2.83	2.25
20	978832	136	4.55	100	-	-	-	0.53	0.22	-	-	38	38	-	-	110	-	6.4	-	4.11	-
21	986585	133	3.29	102	137	3.04	108	0.9	0.43	1.06	0.44	93	214	21	72	90	65	5.2	4.3	3.74	2.92
22	980697	135	4.16	108	-	-	-	0.42	0.08	-	-	40	28	-	-	106	-	5.8	-	3.87	-
23	986965	137	4.89	105	-	-	-	0.42	0.19	-	-	87	132	-	-	109	-	5.1	-	3.81	-
24	1099577	139	4.17	100	-	-	-	0.59	0.33	-	-	40	167	-	-	249	-	5.5	-	4.12	-
25	1001038	130	2.92	97	-	-	-	0.53	0.26	0.53	0.23	21	9	50	22	58	77	5.6	4.4	3.42	2.6
26	1083562	135	4.14	99	-	-	-	0.27	0.14	-	-	8	18	-	-	59	-	5.3	-	3.53	-
27	988999	130	4.63	97	-	-	-	0.8	0.08	-	-	66	49	-	-	140	-	4.7	-	3.26	-
28	408381	135	4.24	101	137	3.38	108	0.87	0.46	0.2	0.05	28	36	18	18	149	116	4.8	4.1	2.92	2.47
29	999774	137	4.22	101	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
30	1027876	142	4.11	106	-	-	-	0.34	0.08	-	-	24	37	-	-	181	-	5.8	-	3.93	-
31	1007803	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
32	1054345	132	3.17	99	136	3.52	101	1.25	0.83	2.28	2.04	35	78	37	30	152	81	5.5	3.8	3.9	2.35
33	1007803	136	4.23	100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
34	1034139	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
35	1083562	140	3.75	108	-	-	-	0.49	0.29	-	-	106	103	-	-	138	-	4.7	-	3.09	-
36	1111596	136	3.95	100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
37	999774	135	3.66	98	-	-	-	-	-	-	-	31	48	-	-	-	-	-	-	-	-
38	1051603	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
39	1115760	134	3.53	98	127	3.52	102	1.21	0.27	-	-	37	57	-	-	273	-	5.5	-	3.5	-
40	1111596	132	4.42	100	-	-	-	0.32	0.14	-	-	22	21	-	-	122	-	6.2	-	3.8	-
41	1083562	-	-	-	-	-	-	0.67	0.26	-	-	23	35	-	-	209	-	6.3	-	3.84	-
42	930891	137	4.25	101	-	-	-	0.35	0.07	-	-	24	19	-	-	58	-	7	-	3.79	-
43	1123830	137	3.75	102	-	-	-	-	-	-	-	23	20	-	-	-	-	-	-	-	-
44	1009172	-	-	-	-	-	-	-	-	-	-	57	169	-	-	-	-	-	-	-	-
45	1075035	-	-	-	-	-	-	-	-	-	-	31	50	-	-	-	-	-	-	-	-
46	1073267	137	3.85	102	-	-	-	-	-	-	-	42	24	-	-	-	-	-	-	-	-
47	932574	136	4.03	100	-	-	-	1.12	0.19	-	-	65	62	-	-	261	-	7.1	-	4.3	-
48	867814	134	4.29	107	141	5.15	107	0.45	0.12	-	-	142	302	-	-	120	-	5.8	-	4.38	-
49	924163	139	3.73	106	135	3.35	100	0.65	0.13	-	-	27	22	-	-	168	-	6.4	-	4.31	-
50	1116685	133	3.98	98	134	4.15	100	1.08	0.31	0.45	0.12	65	93	25	28	129	143	6.5	6	4.17	3.54
51	992452	138	4.16	103	-	-	-	0.48	0.1	-	-	86	115	-	-	145	-	6.5	-	4.62	-
52	1027876	143	3.74	105	135	4.13	102	0.67	0.26	0.66	0.18	32	93	68	107	204	173	5.6	5.2	4.14	3.41
53	1149579	137	3.51	103	140	3.52	105	0.59	0.13	0.34	0.08	19	32	26	34	153	95	6.4	5.6	4.32	3.95
54	1152070	134	4.21	100	-	-	-	0.62	0.15	-	-	32	33	-	-	229	-	6.1	-	3.62	-
55	1073267	138	4.21	101	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
56	1140002	132	4.13	98	-	-	-	0.16	0.35	-	-	23	26	-	-	-	-	-	-	-	-
57	1141514	137	4.05	97	-	-	-	0.86	0.39	-	-	35	104	-	-	215	-	6.8	-	4.74	-
58	1197282	138	3.53	105	136	3.64	105	0.45	0.2	0.52	0.14	37	88	13	15	123	107	5.6	6.1	4.28	3.62
59	1114766	137	3.78	99	-	-	-	0.76	0.21	-	-	27	42	-	-	121	-	6.5	-	4.72	-
60	1034748	129	4.35	93	-	-	-	0.42	0.16	-	-	33	36	-	-	163	-	5.8	-	3.67	-
61	1123830	140	4.07	104	-	-	-	0.67	0.26	-	-	37	33	-	-	220	-	6.1	-	4.73	-
62	1227585	134	4.35	100	-	-	-	0.21	0.08	-	-	31	33	-	-	154	-	7.9	-	4.51	-
63	1099662	138	3.55	102	-	-	-	0.91	0.25	-	-	11	30	-	-	191	-	6.3	-	4.63	-

Sr. No	MRD NO	Blood Culture	Urine routine	Urine culture	Chest X-ray	Galactomannan	Clostridium difficile
1	934745	ng	normal	Positive (E.coli)	NAD	-	-
2	1004593	ng	normal	Positive (E.coli)	NAD	neg	-
3	967918	ng	normal	ng	NAD	-	-
4	930891	ng	normal	ng	NAD	-	-
5	1001038	ng	normal	ng	NAD	pos	-
6	1012023	ng	pus cells	ng	NAD	-	neg
7	978832	ng	normal	Positive (Enterococcus)	NAD	pos	-
8	1007143	ng	normal	ng	NAD	-	-
9	988999	ng	normal	ng	OPACITIES	pos	-
10	1007803	ng	normal	ng	OPACITIES	-	-
11	968727	ng	normal	ng	NAD	neg	-
12	1054345	ng	normal	Positive (Serratia liquefaciens)	NAD	-	-
13	1027876	Positive (Acinetobacter baumanii)	pus cells	ng	NAD	-	-
14	934745	ng	normal	ng	INFILTRATES	-	-
15	930891	ng	normal	ng	NAD	-	-
16	1026634	ng	normal	ng	NAD	-	-
17	1047635	Positive (Klebsiella pneumoniae)	normal	ng	OPACITIES	pos	-
18	1060418	ng	normal	Positive (E.coli)	NAD	-	-
19	968429	Positive (Pseudomonas aeruginosa)	normal	ng	COLLAPSE	-	positive
20	978832	ng	normal	ng	OPACITIES	-	-
21	986585	ng	normal	ng	OPACITIES	-	neg
22	980697	ng	pus cells	ng	NAD	-	-
23	986965	ng	normal	ng	NAD	-	-
24	1099577	ng	normal	ng	NAD	-	-
25	1001038	Positive (Pseudomonas aeruginosa)	normal	ng	NAD	pos	-
26	1083562	ng	normal	ng	NAD	-	-
27	988999	ng	normal	ng	OPACITIES	-	-
28	408381	ng	normal	ng	NAD	-	-
29	999774	ng	normal	Positive (Klebsiella pneumoniae)	NAD	-	-
30	1027876	ng	normal	ng	NAD	-	-
31	1007803	Positive (Enterobacter cloacae)	normal	ng	NAD	-	-
32	1054345	Positive (Klebsiella pneumoniae)	normal	ng	NAD	pos	-
33	1007803	ng	normal	ng	NAD	neg	-
34	1034139	ng	normal	ng	NAD	-	-
35	1083562	ng	normal	ng	NAD	neg	-
36	1111596	Positive (Streptococcus agalactiae)	normal	Positive (Pseudomonas aeuginosa)	NAD	-	-
37	999774	ng	pus cells	Positive (Klebsiella pneumoniae)	NAD	-	-
38	1051603	ng	normal	ng	NAD	-	-
39	1115760	Positive (E.coli)	normal	ng	NAD	-	-
40	1111596	ng	normal	Positive (Pseudomonas aeuginosa)	NAD	-	-
41	1083562	ng	normal	ng	NAD	-	-
42	930891	ng	normal	ng	NAD	-	-
43	1123830	ng	normal	ng	NAD	neg	-
44	1009172	ng	normal	ng	NAD	neg	-
45	1075035	ng	normal	ng	NAD	pos	-
46	1073267	ng	normal	ng	NAD	-	-
47	932574	ng	normal	ng	NAD	-	-
48	867814	ng	pus cells	ng	OPACITIES	neg	-
49	924163	ng	normal	ng	NAD	-	-
50	1116685	Positive (Klebsiella pneumoniae)	normal	ng	NAD	-	-
51	992452	ng	normal	ng	NAD	-	-
52	1027876	ng	normal	ng	NAD	neg	-
53	1149579	ng	normal	ng	NAD	-	-
54	1152070	ng	pus cells	ng	NAD	-	-
55	1073267	ng	normal	ng	NAD	-	-
56	1140002	ng	normal	ng	NAD	-	-
57	1141514	ng	normal	ng	NAD	-	-
58	1197282	Positive (Klebsiella oxytoca)	normal	ng	NAD	neg	-
59	1114766	ng	normal	ng	NAD	pos	-
60	1034748	ng	normal	ng	NAD	-	-
61	1123830	ng	normal	ng	NAD	-	-
62	1227585	ng	normal	ng	NAD	-	-
63	1099662	Positive (Pseudomonas aeruginosa)	pus cells	ng	INFILTRATES	-	-

Sr. No	MRD NO	Others	Date & time of onset of fever	Date & time of arrival to hospital	Duration b/w onset of Fever & Arrival to Hospital	Time of administration of antibiotics	Duration b/w Arrival & Anitibotics Administration	Delay	before arrival to hospital	after arrival to hospital	Cause_non availability of transport	Cause_Ingestion of NSAID at home
1	934745	-	02/03/21, 05:30 pm	02/03/21, 06:30 pm	60	02/03/21, 07:00 pm	30	y	y	-	-	y
2	1004593	-	02/03/21, 5:00 pm	02/03/21, 8:30 pm	210	02/03/21, 9:00 pm	30	y	y	-	y	-
3	967918	-	04/03/21, 1:00 pm	inpatient	-	04/03/21, 1:30 pm	30	n	-	-	-	-
4	930891	-	05/03/21, 08:30 am	05/03/21, 10:30 am	120	05/03/21, 12:30 pm	120	y	y	-	y	-
5	1001038	-	09/03/21, 09:00 am	09/03/21, 2:30 pm	330	09/03/21, 3:00 pm	30	y	y	-	y	-
6	1012023	-	09/03/21, 5:00 pm	09/03/21, 08:30 pm	210	09/03/21, 8:45 pm	15	y	y	-	-	y
7	978832	-	11/03/21, 9:30 pm	inpatient	-	11/03/21, 10 pm	30	n	-	-	-	-
8	1007143	-	13/03/21, 8:00 am	inpatient	-	13/03/21, 06:30 pm	630	y	-	y	-	-
9	988999	ECHO-GHLV, EF-22%	10/03/21, 1 pm	13/03/21, 10 AM	4320	13/03/21, 1:30 pm	210	y	y	-	y	-
10	1007803	-	20/03/21, 11 pm	20/03/21, 11:25 pm	25	20/03/21, 11:55 pm	30	n	-	-	-	-
11	968727	-	27/03/21, 8 am	27/03/21, 2:30 pm	390	27/03/21, 7 pm	300	y	y	-	y	y
12	1054345	MRI Brain-NAD	06/04/21, 6:10 pm	06/04/21, 6:35 pm	25	06/04/21, 7 pm	25	n	-	-	-	-
13	1027876	-	30/03/21, 4 am	30/03/21, 5:40 am	100	30/03/21, 6 am	20	y	y	-	y	-
14	934745	COVID positive	28/03/21, 11:30 pm	28/03/21, 11:55 pm	25	29/03/21, 12:15 am	20	n	-	-	-	-
15	930891	-	10/04/21, 10 am	10/04/21, 11:45 am	105	10/04/21, 12:15 pm	30	y	y	-	-	y
16	1026634	-	07/04/21, 2 pm	inpatient	-	07/04/21, 02:20 pm	20	n	-	-	-	-
17	1047635	-	12/04/21, 4 pm	13/04/21, 07:30 am	930	13/04/21, 10:15 am	165	y	y	-	-	y
18	1060418	-	16/04/21, 07:30 pm	inpatient	-	Antibiotics ongoing	0	n	-	-	-	-
19	968429	HLH+ (B.M-Haemophagocytosis), CMV IgG+	17/04/21, 02:45 am	17/04/21, 7 am	255	17/04/21, 07:10 am	10	y	y	-	-	y
20	978832	COVID positive	25/04/21, 09:15 pm	25/04/21, 09:55 pm	40	25/04/21, 10:25 pm	30	n	-	-	-	-
21	986585	USG- ASCITES	21/04/21, 2:00 am	21/04/21, 2:50 am	50	21/04/21, 03:00 am	10	n	-	-	-	-
22	980697	COVID positive	30/04/21, 07:30 pm	30/04/21, 09:30 pm	120	30/04/21, 10 pm	30	y	y	-	y	-
23	986965	COVID positive	01/05/21, 8:30 pm	01/05/21, 08:40 pm	10	01/05/21, 08:45 pm	5	n	-	-	-	-
24	1099577	-	03/05/21, 11 pm	inpatient	-	03/05/21, 11:20 pm	20	n	-	-	-	-
25	1001038	ECHO-GHLV, EF-26%	02/05/21, 1 pm	03/05/21, 11:45 am	1380	03/05/21, 12:10 pm	25	y	y	-	y	-
26	1083562	-	01/05/21, 2:30 pm	inpatient	-	Antibiotics ongoing	60	n	-	-	-	-
27	988999	COVID positive	04/05/21, 4 am	04/05/21, 10 am	360	04/05/21, 10:30 am	30	y	y	-	y	-
28	408381	-	11/05/21, 01:50 pm	inpatient	-	11/05/21, 02:15 pm	25	n	-	-	-	-
29	999774	-	18/05/21, 5 pm	18/05/21, 7:30 pm	150	18/05/21, 10 pm	150	y	y	-	y	-
30	1027876	-	19/05/21, 07:00 am	19/05/21, 8 am	60	19/05/21, 09:00 am	60	y	y	-	y	-
31	1007803	-	11/06/21, 12:10 pm	11/06/21, 12:20 pm	10	11/06/21, 12:30 pm	10	n	-	-	-	-
32	1054345	ECHO-GHLV, EF-45%	14/06/21, 04:30 am	14/06/21, 7 am	150	14/06/21, 07:30 am	30	y	y	-	-	-
33	1007803	-	19/06/21, 06:30 pm	19/06/21, 7 pm	30	19/06/21, 07:30 pm	30	n	-	-	-	-
34	1034139	-	23/06/21, 2:45 pm	inpatient	-	23/06/21, 03:40 pm	65	y	-	y	-	-
35	1083562	-	19/06/21, 4 am	inpatient	-	19/06/21, 04:30 am	30	n	-	-	-	-
36	1111596	-	20/06/21, 4 am	inpatient	-	20/06/21, 4:30 am	30	n	-	-	-	-
37	999774	-	19/06/21, 3 pm	19/06/21, 05:30 pm	150	19/06/21, 05:45 pm	15	y	y	-	y	y
38	1051603	-	22/06/21, 10:15 pm	inpatient	-	22/06/21, 11 pm	45	n	-	-	-	-
39	1115760	BAL C/S + Klebsiella pneumoniae, ECHO:GHLV-16%, MRI-IVH	15/06/21, 09:35 am	15/06/21, 09:40 am	5	15/06/21, 10:15 am	40	n	-	-	-	-
40	1111596	-	02/07/21, 11:35 pm	inpatient	-	03/07/21, 12 am	25	n	-	-	-	-
41	1083562	-	03/07/21, 08:05 pm	04/07/21, 01:15 am	300	03/07/21, 09:05 pm	60	y	y	-	-	-
42	930891	-	06/07/21, 1 pm	06/07/21, 2 pm	60	06/07/21, 3 pm	60	y	y	-	-	-
43	1123830	-	06/07/21, 10:45 am	inpatient	-	06/07/21, 10:50 am	5	n	-	-	-	-
44	1009172	-	13/07/21, 5 pm	inpatient	-	13/07/21, 05:30 pm	30	n	-	-	-	-
45	1075035	-	16/07/21, 9 pm	17/07/21, 04:30 pm	1200	17/07/21, 04:45 pm	15	y	y	-	-	-
46	1073267	CT Chest- Anterior mediastinal mass, normaal lung parenchyma	15/07/21, 09:15 pm	inpatient	-	15/07/21, 10 pm	45	n	-	-	-	-
47	932574	-	05/10/21, 9 am	inpatient	-	05/10/21, 10 am	60	y	-	y	-	-
48	867814	CT Chest-Centrilobular nodules in right middle lobe	03/10/21, 5 pm	inpatient	-	03/10/21, 6 pm	60	y	-	y	-	-
49	924163	-	03/10/21, 08:30 pm	inpatient	-	03/10/21, 9 pm	30	n	-	-	-	-
50	1116685	-	08/10/21, 9 am	08/10/21, 3 pm	360	08/10/21, 03:40 pm	40	y	y	-	y	-
51	992452	-	08/10/21, 9 am	08/10/21, 12:30 pm	210	08/10/21, 01:20 pm	50	y	y	-	-	-
52	1027876	-	08/10/21, 9:15 pm	09/10/21, 6 pm	1380	09/10/21, 6:10 pm	10	y	y	-	-	y
53	1149579	-	06/10/21, 7 pm	06/10/21, 11:50 pm	300	06/10/21, 1 am	70	y	y	-	y	-
54	1152070	-	10/10/21, 1 pm	10/10/21, 2:30 pm	90	10/10/21, 4 pm	90	y	y	-	y	y
55	1073267	-	07/10/21, 6 am	inpatient	-	07/10/21, 6:30 am	30	n	-	-	-	-
56	1140002	-	17/11/21, 02:40 pm	inpatient	-	17/11/21, 3 pm	20	n	-	-	-	-
57	1141514	CT Chsst- No lung parenchyma involvement	19/11/21, 6:30 pm	19/11/21, 07:20 pm	50	19/11/21, 7:30 pm	60	y	-	y	-	-
58	1197282	CT Orbit- NAD	29/12/21, 11 am	inpatient	-	29/12/21, 11:50 am	50	n	-	-	-	-
59	1114766	-	31/12/21, 2:15 pm	31/12/21, 6:10 pm	240	31/12/21, 6:30 pm	20	y	y	-	y	-
60	1034748	-	31/12/21, 10:30 pm	02/01/22, 9:20 am	4320	02/01/22, 9:50 am	30	y	y	-	-	-
61	1123830	-	05/01/22, 10 am	05/01/22, 10:30 am	30	05/01/22, 10:50 am	20	n	-	-	-	-
62	1227585	-	06/01/22, 5:30 am	06/1/22, 3:30 pm	600	06/01/22, 3:50 pm	20	y	y	-	-	y
63	1099662	COVID positive	17/02/22, 11 am	17/02/22, 3:30 pm	270	17/02/22, 4 pm	30	y	y	-	-	y

Sr. No	MRD NO	Cause Unawareness of situation	Cause Hospital related	Time to defervescence (days)	Antibiotics given	Duration of antibiotics (days)	Need to step up antibiotics 2nd line	Need to step up antibiotics 3th line line	Fungal infection	Possible	Probable	Proven	Need of Anti-Fungals	Need of Anti-virals	Requirement of Oxygen
1	934745	-	-	1	Magnex, Amikacin	8	-	-	-	-	-	-	-	-	-
2	1004593	-	-	3	Magnex, Amikacin	9	-	-	y	y	-	-	y	-	-
3	967918	-	-	1	Magnex, Amikacin	4	-	-	-	-	-	-	y	-	-
4	930891	-	-	5	Magnex, Amikacin	7	-	-	-	-	-	-	-	-	-
5	1001038	-	-	1	Magnex, Amikacin	7	-	-	y	y	-	-	y	-	-
6	1012023	-	-	10	Magnex, Amikacin	7	y (Teicoplanin)	-	y	y	-	-	y	-	-
7	978832	-	-	1	Magnex, Amikacin	7	-	-	y	y	-	-	y	-	-
8	1007143	-	y	6	Magnex, Amikacin	7	y (Metronidazole)	-	-	-	-	-	-	-	-
9	988999	-	-	15	Magnex, Amikacin	14	y (Meropenem, Teicoplanin)	-	y	y	-	-	y	-	y
10	1007803	-	-	6	Magnex, Amikacin	6	y (Vancomycin, Azithromycin)	-	-	-	-	-	-	-	-
11	968727	-	-	7	Magnex, Amikacin	7	-	-	y	y	-	-	y	-	-
12	1054345	-	-	7	Magnex, Amikacin	7	y (Imipenem, Teicoplanin)	-	y	y	-	-	y	-	-
13	1027876	-	-	5	Magnex, Amikacin	5	-	-	y	y	-	-	y	-	-
14	934745	-	-	5	Magnex, Amikacin	5	-	-	-	-	-	-	-	-	-
15	930891	-	-	4	Magnex, Amikacin	5	-	-	-	-	-	-	-	-	-
16	1026634	-	-	5	Magnex, Amikacin	5	-	-	-	-	-	-	-	-	-
17	1047635	-	-	MORTALITY	Magnex, Amikacin	7	y (Imipenem, Teicoplanin, Tigecycline)	-	y	y	-	-	y	-	y
18	1060418	-	-	3	Magnex, Amikacin	8	y (Teicoplanin)	-	y	y	-	-	y	-	-
19	968429	-	-	DAMA	Magnex, Amikacin	21	y (Meropenem, Vancomycin)	y (Clindamycin)	y	y	-	-	y	-	y
20	978832	-	-	3	Magnex, Amikacin	5	-	-	-	-	-	-	-	-	-
21	986585	-	-	8	Magnex, Amikacin	10	y (Vancomycin, Metronidazole)	-	y	y	-	-	y	-	y
22	980697	-	-	5	Magnex, Amikacin	7	y (Meropenem, Vancomycin)	-	y	y	-	-	y	-	-
23	986965	-	-	3	Magnex, Amikacin	3	-	-	-	-	-	-	-	-	-
24	1099577	-	-	5	Magnex, Metronidazole	5	y (Teicoplanin)	-	y	y	-	-	y	-	-
25	1001038	-	-	7	Magnex, Amikacin	7	-	-	y	y	-	-	y	-	-
26	1083562	-	-	5	Magnex, Amikacin	5	-	-	y	y	-	-	-	-	-
27	988999	-	-	4	Magnex, Amikacin	5	y (Metronidazole)	-	-	-	-	-	-	-	y
28	408381	-	-	8	Magnex, Amikacin	9	y (Vancomycin)	-	y	y	-	-	y	-	-
29	999774	-	-	10	Magnex, Amikacin	10	y (Polymyxin B, Fosfomycin)	-	y	y	-	-	y	-	-
30	1027876	-	-	7	Magnex, Amikacin	7	-	-	y	y	-	-	y	-	-
31	1007803	-	-	6	Magnex, Amikacin	7	-	-	y	y	-	-	y	-	-
32	1054345	-	-	MORTALITY	Magnex, Amikacin	5	y (Meropenem, Teicoplanin)	y (Colistin, Tigecycline)	y	-	y	-	y	-	y
33	1007803	-	-	7	Meropenem, Teicoplanin	10	y (Colistin)	-	y	y	-	-	y	-	-
34	1034139	-	y	3	Magnex, Amikacin	8	y (Meropenem, Polymyxin B)	-	-	-	-	-	-	-	-
35	1083562	-	-	3	Meropenem, Amikacin	10	y (Colistin, Teicoplanin)	-	y	y	-	-	y	-	-
36	1111596	-	-	2	Magnex, Amikacin	7	y (Polymxin, Linezolid, Vancomycin)	-	y	y	-	-	y	-	-
37	999774	-	-	5	Magnex, Amikacin	7	y (Imipenem)	-	-	-	-	-	-	-	-
38	1051603	-	-	4	Magnex, Amikacin	9	-	-	y	y	-	-	y	-	-
39	1115760	-	-	20	Magnex, Amikacin	22	y (Meropenem, Vancomycin)	-	y	y	-	-	y	-	y
40	1111596	-	-	3	Magnex, Amikacin	7	-	-	-	-	-	-	-	-	-
41	1083562	-	-	7	Magnex, Amikacin	10	-	-	y	y	-	-	y	-	-
42	930891	-	-	3	Magnex, Amikacin	4	-	-	-	-	-	-	-	-	-
43	1123830	-	-	7	Magnex, Amikacin	7	-	-	-	-	-	-	-	-	-
44	1009172	-	-	3	Magnex, Teicoplanin	5	y (Meropenem)	-	y	y	-	-	y	y	-
45	1075035	-	-	5	Magnex, Amikacin	5	-	-	-	-	-	-	-	-	-
46	1073267	-	-	2	Magnex, Amikacin	5	-	-	-	-	-	-	-	-	-
47	932574	-	y	10	Magnex, Amikacin	12	-	-	-	-	-	-	-	-	-
48	867814	-	y	5	Magnex, Amikacin	10	y (Vancomycin)	-	y	y	-	-	y	-	y
49	924163	-	-	10	Magnex, Amikacin	10	y (Meropenem, Vancomycin)	-	y	y	-	-	y	-	-
50	1116685	-	-	15	Magnex, Amikacin	15	y (Meropenem, Vancomycin)	-	-	-	-	-	-	-	y
51	992452	-	-	7	Cefepime, Amikacin	7	-	-	-	-	-	-	-	-	-
52	1027876	-	-	14	Magnex, Amikacin	22	y (Meropenem, Vancomycin, Teicoplanin)	-	y	y	-	-	y	-	-
53	1149579	-	-	6	Magnex, Amikacin	7	-	-	-	-	-	-	-	-	-
54	1152070	-	-	12	Magnex, Amikacin	14	y (Meropenem, Ciprofloxacin)	-	y	y	-	-	-	-	-
55	1073267	-	-	1	Magnex, Amikacin	3	-	-	y	y	-	-	y	-	-
56	1140002	-	-	4	Cefepime, Teicoplanin	5	-	-	-	-	-	-	-	-	-
57	1141514	-	y	5	Meropenem, Vancomycin	5	-	-	-	-	-	-	-	-	-
58	1197282	-	-	15	Magnex, Amikacin	15	y (Meropenem, Teicoplanin)	-	y	y	-	-	y	-	-
59	1114766	-	-	5	Cefepime	5	y (Meropenem, Vancomycin)	-	y	y	-	-	y	-	-
60	1034748	y	-	7	Magnex, Amikacin	7	-	-	-	-	-	-	-	-	-
61	1123830	-	-	5	Magnex, Amikacin	5	-	-	-	-	-	-	-	-	-
62	1227585	-	-	5	Magnex, Amikacin	5	-	-	-	-	-	-	-	-	-
63	1099662	-	-	5	Magnex, Amikacin	7	y (Meropenem, Vancomycin)	-	y	y	-	-	y	-	y

Sr. No	MRD NO	Requirement of Ventilation	non-invasive	Invasive	Requirement of Inotropes	Inotrope given	Inotropes No.of days	Requirement of PICU	PICU Duration of stay (days)	Requirement of blood products	Packed cell (PC)	RDP	OUT COME Recovery	with in 1 week	> 1 week	DAMA	Mortality	Shifted to PICU	Duration of hospital stay (days)
1	934745	-	-	-	-	-	-	-	-	y	1	1	y	-	y	-	-	-	8
2	1004593	-	-	-	-	-	-	-	-	y	1	2	y	-	y	-	-	-	9
3	967918	-	-	-	-	-	-	-	-	-	-	-	y	y	-	-	-	-	5
4	930891	-	-	-	-	-	-	-	-	-	-	-	y	y	-	-	-	-	7
5	1001038	-	-	-	-	-	-	-	-	y	1	-	y	-	y	-	-	-	11
6	1012023	-	-	-	-	-	-	-	-	y	1	-	y	-	y	-	-	-	12
7	978832	-	-	-	-	-	-	-	-	y	1	2	y	y	-	-	-	-	7
8	1007143	-	-	-	-	-	-	-	-	y	1	-	y	-	y	-	-	-	13
9	988999	y	y	-	y	Dobutamine	2	y	5	y	2	1	y	-	y	-	-	y	15
10	1007803	-	-	-	-	-	-	-	-	y	1	-	y	y	-	-	-	-	7
11	968727	-	-	-	-	-	-	-	-	y	1	2	y	-	y	-	-	-	8
12	1054345	-	-	-	-	-	-	-	-	y	2	1	y	-	y	-	-	-	9
13	1027876	-	-	-	-	-	-	-	-	y	2	2	y	y	-	-	-	-	5
14	934745	-	-	-	-	-	-	-	-	y	1	3	y	y	-	-	-	-	6
15	930891	-	-	-	-	-	-	-	-	-	-	-	y	y	-	-	-	-	6
16	1026634	-	-	-	-	-	-	-	-	y	1	1	y	y	-	-	-	-	7
17	1047635	y	y	y	y	Dopamine, Nor-epinephrine, Epinephrine	2	y	2	y	4	5	-	-	-	-	y	y	7
18	1060418	-	-	-	-	-	-	-	-	-	-	-	y	-	y	-	-	-	8
19	968429	y	y	-	y	Dopamine, Nor-epinephrine, Dobutamine	6	y	7	y	3	13	-	-	-	y	-	y	21
20	978832	-	-	-	-	-	-	-	-	y	-	2	y	y	-	-	-	-	6
21	986585	-	-	-	y	Dobutamine, Nor-epinephrine	2	y	2	y	2	2	y	-	y	-	-	y	12
22	980697	-	-	-	-	-	-	-	-	-	-	-	y	y	-	-	-	-	7
23	986965	-	-	-	-	-	-	-	-	-	-	-	y	y	-	-	-	-	4
24	1099577	-	-	-	-	-	-	-	-	y	1	-	y	y	-	-	-	-	6
25	1001038	-	-	-	-	-	-	-	-	y	1	1	y	-	y	-	-	-	7
26	1083562	-	-	-	-	-	-	-	-	y	2	-	y	y	-	-	-	-	6
27	988999	-	-	-	-	-	-	-	-	-	-	-	y	y	-	-	-	-	5
28	408381	-	-	-	-	-	-	-	-	y	1	-	y	-	y	-	-	-	10
29	999774	-	-	-	-	-	-	-	-	y	1	1	y	-	y	-	-	-	14
30	1027876	-	-	-	-	-	-	-	-	y	1	1	y	-	y	-	-	-	10
31	1007803	-	-	-	-	-	-	-	-	y	-	1	y	y	-	-	-	-	7
32	1054345	y	y	y	y	Dobutamine, Nor-epinephrine, Epinephrine	4	y	4	y	2	8	-	-	-	-	y	y	5
33	1007803	-	-	-	-	-	-	-	-	y	1	-	y	-	y	-	-	-	12
34	1034139	-	-	-	-	-	-	-	-	y	1	-	y	y	-	-	-	-	12
35	1083562	-	-	-	-	-	-	-	-	y	1	-	y	-	y	-	-	-	15
36	1111596	-	-	-	-	-	-	-	-	-	-	-	y	-	y	-	-	-	10
37	999774	-	-	-	-	-	-	-	-	y	1	-	y	-	y	-	-	-	8
38	1051603	-	-	-	-	-	-	-	-	y	1	1	y	-	y	-	-	-	10
39	1115760	y	y	y	y	Dobutamine, Nor-epinephrine, Epinephrine	7	y	10	y	2	2	y	-	y	-	-	y	25
40	1111596	-	-	-	-	-	-	-	-	y	1	1	y	-	y	-	-	-	8
41	1083562	-	-	-	-	-	-	-	-	y	1	-	y	-	y	-	-	-	10
42	930891	-	-	-	-	-	-	-	-	-	-	-	y	y	-	-	-	-	4
43	1123830	-	-	-	-	-	-	-	-	-	-	-	y	y	-	-	-	-	7
44	1009172	-	-	-	-	-	-	-	-	-	-	-	y	y	-	-	-	-	6
45	1075035	-	-	-	-	-	-	-	-	y	1	-	y	y	-	-	-	-	6
46	1073267	-	-	-	-	-	-	-	-	-	-	-	y	y	-	-	-	-	6
47	932574	-	-	-	-	-	-	-	-	y	1	2	y	-	y	-	-	-	14
48	867814	-	-	-	-	-	-	-	-	y	-	1	y	-	y	-	-	-	10
49	924163	-	-	-	-	-	-	-	-	y	1	1	y	-	y	-	-	-	12
50	1116685	-	-	-	-	-	-	-	-	y	1	-	y	-	y	-	-	-	15
51	992452	-	-	-	-	-	-	-	-	-	-	-	y	y	-	-	-	-	7
52	1027876	-	-	-	-	-	-	-	-	y	2	1	y	-	y	-	-	-	24
53	1149579	-	-	-	-	-	-	-	-	-	-	-	y	y	-	-	-	-	7
54	1152070	-	-	-	-	-	-	-	-	y	2	1	y	-	y	-	-	-	15
55	1073267	-	-	-	-	-	-	-	-	-	-	-	y	y	-	-	-	-	3
56	1140002	-	-	-	-	-	-	-	-	-	-	-	y	-	y	-	-	-	8
57	1141514	-	-	-	-	-	-	-	-	-	-	-	y	y	-	-	-	-	6
58	1197282	-	-	-	-	-	-	-	-	y	1	1	y	-	y	-	-	-	15
59	1114766	-	-	-	-	-	-	-	-	-	-	-	y	y	-	-	-	-	7
60	1034748	-	-	-	-	-	-	-	-	-	-	-	y	y	-	-	-	-	7
61	1123830	-	-	-	-	-	-	-	-	y	1	-	y	y	-	-	-	-	7
62	1227585	-	-	-	-	-	-	-	-	-	-	-	y	y	-	-	-	-	6
63	1099662	-	-	-	-	-	-	-	-	y	1	4	y	y	-	-	-	-	7

Sr. No	MRD NO	DATE OF ADMISSION	NAME	TIME OF ADMISSION	PHO FILE NO	Age (Years)	Age group	Gender	Weight (kg)	Height (cm)	Weight centile	Height centile	BMI centile	Grade of nutrition	Body mass index	Mid upper arm circumference	Diagnosis (type of malignancy)	Stage/Risk_Standard	Stage/Risk_Intermediate
64	1034748	1/2/2022	S	12:35 PM	-	8	2	Male	24	126	3rd-97th	3rd-97th	3rd-97th	-	15.1	14	B-ALL	y	-
65	1152070	1/12/2022	P	4:05 PM	-	7	2	Male	20	120	3rd-97th	3rd-97th	3rd-97th	-	13.9	14	AML	-	y
66	1201883	1/15/2022	T	10:15 AM	-	2	1	Male	12	85	3rd-97th	3rd-97th	-	-	16.6	13	B-ALL	y	-
67	311381	1/21/2022	H	8:35 AM	-	6	2	Male	22	112	3rd-97th	3rd-97th	>97th	Over-weight	17.5	14	B-ALL	-	y
68	1227216	1/22/2022	P	8:15 AM	-	1	1	Male	10	74	3rd-97th	3rd-97th	-	-	18.3	12.5	B-ALL	-	-
69	1114282	2/2/2022	A	7:28 PM	-	2	1	Male	12.4	84	3rd-97th	3rd-97th	-	-	17.6	12	B-ALL	-	y
70	1121402	2/3/2022	P	2:55 PM	-	3	1	Male	15	91	3rd-97th	3rd-97th	-	-	18.1	13	B-ALL	y	-
71	1026634	2/4/2022	TSB	5:50 PM	-	3	1	Male	12	104	3rd-97th	>97th	-	-	11.1	13	B-ALL	y	-
72	1191735	2/14/2022	A	8:55 PM	-	5	2	Male	15	105	3rd-97th	3rd-97th	-	-	13.6	12	B-ALL	-	y
73	1201579	2/14/2022	S	12:20 PM	-	3	1	Male	14	90	3rd-97th	3rd-97th	-	-	17.3	13	B-ALL	y	-
74	632509	2/15/2022	N	7:40 PM	-	15	3	Male	38	158	3rd-97th	3rd-97th	-	-	15.2	14	B-ALL (Relapse)	-	-
75	1034139	3/4/2022	P	9:50 AM	-	4	1	Male	13	98	3rd-97th	3rd-97th	-	-	13.5	13	B-ALL	y	-
76	209577	3/9/2022	M	3:30 PM	-	5	2	Male	16	110	3rd-97th	3rd-97th	-	-	13.2	14	B-ALL	-	y
77	1236314	3/9/2022	R	10:20 AM	-	16	3	Female	36	162	3rd-97th	3rd-97th	<3rd	Under-weight	13.7	15	Osteosarcoma	-	-
78	1225022	3/11/2022	K	12:50 AM	-	11	3	Female	40	140	3rd-97th	3rd-97th	>97th	Over-weight	28.6	17	Ewing sarcoma (Renal PNET)	-	-
79	1195673	3/16/2022	J	12:35 PM	-	14	3	Female	39	154	3rd-97th	3rd-97th	3rd-97th	Over-weight	16.4	15	Osteosarcoma	y	-
80	1244680	3/17/2022	S	2:25 PM	-	16	3	Male	40	158	3rd-97th	3rd-97th	3rd-97th	-	16	16	Osteosarcoma	y	-
81	1239758	3/20/2022	B	10:30 AM	-	16	3	Female	56	159	3rd-97th	3rd-97th	3rd-97th	-	22.2	16	B-ALL	-	-
82	1240583	3/21/2022	A	6:15 PM	-	15	3	Female	40	148	3rd-97th	3rd-97th	3rd-97th	Over-weight	18.3	14	T-ALL	-	-
83	1221576	3/20/2022	A	11:40 AM	-	14	3	Male	40	130	3rd-97th	<3rd	-	-	23.7	14	B-ALL	y	-
84	1225022	3/28/2022	K	11:55 PM	-	11	3	Female	43	140	3rd-97th	3rd-97th	>97th	Over-weight	28.8	17	Ewing sarcoma (Renal PNET)	-	-
85	1222541	3/30/2022	A	9:35 AM	-	2	1	Female	11	78	3rd-97th	<3rd	-	-	18.1	16	B-ALL	y	-
86	1266210	3/31/2022	A	12:26 PM	-	4	1	Male	12	96	<3rd	3rd-97th	-	-	13	12	B-ALL	y	-
87	1271328	4/2/2022	P	7:15 PM	-	8	2	Male	24	118	3rd-97th	3rd-97th	>97th	Over-weight	17.2	13.5	B-ALL	y	-
88	1123830	4/3/2022	AP	11:05 AM	-	7	2	Male	19	112	3rd-97th	3rd-97th	3rd-97th	-	15.1	13	B-ALL	y	-
89	1227216	4/6/2022	P	5:50 AM	-	1	1	Male	10	72	3rd-97th	3rd-97th	-	-	19.3	12	B-ALL	-	-
90	1214769	4/8/2022	M	12:40 PM	-	7	2	Male	18	114	3rd-97th	3rd-97th	3rd-97th	-	13.9	12	Osteosarcoma	-	y
91	1278601	4/8/2022	R	1:55 PM	-	1	1	Male	8	74	3rd-97th	3rd-97th	-	-	14.6	12.5	B-ALL	y	-
92	968727	4/8/2022	S	11:30 AM	-	8	2	Male	21	104	3rd-97th	<3rd	-	-	19.4	13	B-ALL	y	-
93	632509	4/11/2022	N	10:40 AM	-	15	3	Male	32	158	<3rd	3rd-97th	<3rd	Under-weight	12.8	14	B-ALL (Relapse)	-	-
94	1246568	4/11/2022	S	8:10 PM	-	8	2	Male	24	122	3rd-97th	3rd-97th	3rd-97th	-	16.1	13.5	B-ALL	y	-
95	1239393	4/11/2022	P	12:40 PM	-	4	1	Male	14	98	3rd-97th	3rd-97th	-	-	14.6	13	B-ALL	y	-
96	969665	4/12/2022	P	3:40 PM	-	8	2	Male	20	117	3rd-97th	3rd-97th	3rd-97th	-	14.6	14	AML	-	-

Sr. No	MRD NO	Stage/Risk_High	Phase of Chemotherapy_ Intensive phase	Phase of Chemotherapy_ Maintenance phase	days sinse last CHEMOTHERAPY	Presentaion As Inpatient	time since last discharge <72 hours/> 72 HOURS	PICC line	Mucositis	Mucositis GRADE	Peri-Anal Involvement	Peri-Anal Involvement	GIT symptoms	Pain abdomen	Pain abdomen At presentation	Pain abdomen During hospital stay	Diarrhoea	bloody_At presentation	bloody During hospital stay
64	1034748	-	y	-	>7	-	2	y	-	-	-	n	-	-	-	-	-	-	-
65	1152070	-	y	-	>7	-	2	n	-	-	-	n	-	-	-	-	-	-	-
66	1201883	-	y	-	>7	-	2	y	-	-	-	n	-	-	-	-	-	-	-
67	311381	-	-	y	>7	-	2	n	-	-	-	n	-	-	-	-	-	-	-
68	1227216	y	y	-	<7	-	2	y	-	-	y	-	y	-	-	-	y	-	-
69	1114282	-	y	-	>7	-	2	y	-	-	-	n	-	-	-	-	-	-	-
70	1121402	-	-	y	<7	-	2	y	-	-	-	n	y	-	-	-	y	-	-
71	1026634	-	y	-	>7	-	2	y	-	-	-	n	-	-	-	-	-	-	-
72	1191735	-	y	-	>7	-	2	n	-	-	-	n	y	-	-	-	y	y	-
73	1201579	-	y	-	>7	-	2	n	-	-	-	n	-	-	-	-	-	-	-
74	632509	y	-	y	>7	-	2	n	-	-	-	n	-	-	-	-	-	-	-
75	1034139	-	y	-	<7	-	2	y	-	-	-	n	y	-	-	-	y	-	-
76	209577	-	-	y	>7	-	2	n	-	-	-	n	-	-	-	-	-	-	-
77	1236314	y	y	-	<7	-	2	y	y	3	-	n	y	-	-	-	-	-	-
78	1225022	y	y	-	>7	-	2	y	-	-	-	n	y	y	y	-	-	-	-
79	1195673	-	-	y	>7	-	2	n	y	3	-	n	y	-	-	-	y	-	-
80	1244680	-	y	-	>7	-	2	n	-	-	-	n	-	-	-	-	-	-	-
81	1239758	y	y	-	<7	-	2	n	y	2	-	n	y	y	y	-	-	-	-
82	1240583	y	y	-	>7	-	2	y	-	-	-	n	-	-	-	-	-	-	-
83	1221576	-	y	-	>7	-	2	y	y	2	-	n	y	-	-	-	y	-	-
84	1225022	y	y	-	>7	-	2	y	-	-	-	n	-	-	-	-	-	-	-
85	1222541	-	y	-	<7	-	2	y	-	-	-	n	-	-	-	-	-	-	-
86	1266210	-	y	-	>7	-	2	n	-	-	-	n	-	-	-	-	-	-	-
87	1271328	-	y	-	<7	-	1	y	y	2	-	n	y	-	-	-	-	-	-
88	1123830	-	y	-	>7	-	2	n	-	-	-	n	-	-	-	-	-	-	-
89	1227216	y	y	-	>7	-	2	y	-	-	-	n	-	-	-	-	-	-	-
90	1214769	-	-	y	>7	-	2	y	y	2	-	n	y	-	-	-	-	-	-
91	1278601	-	y	-	<7	y	-	y	-	-	-	n	-	-	-	-	-	-	-
92	968727	-	-	y	>7	y	2	n	y	2	-	n	y	-	-	-	-	-	-
93	632509	y	-	y	>7	-	2	n	-	-	-	n	-	-	-	-	-	-	-
94	1246568	-	y	-	<7	-	2	y	-	-	-	n	-	-	-	-	-	-	-
95	1239393	-	y	-	>7	-	2	y	y	2	-	n	y	-	-	-	-	-	-
96	969665	y	y	-	>7	y	-	y	-	-	-	n	y	-	-	-	-	-	-

Sr. No	MRD NO	Non bloody_At presentation	Non bloody_During hospital stay	Respiratory symptoms	Cough	Cough At presentation	Cough During hospital stay	Distress	Distress At presentation	Distress During hospital stay	Urinary complaints	UTI	UTI At presentation	UTI During hospital stay	Oliguria /anuria	Oliguria/ anuria At presentation	Oliguria/ anuria During hospital stay	CVS symptoms	Palpitations	Palpitations At presentation	Palpitations During hospital stay
64	1034748	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
65	1152070	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
66	1201883	-	-	y	y	y	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
67	311381	-	-	y	y	y	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
68	1227216	-	y	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
69	1114282	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
70	1121402	y	-	y	y	-	y	y	-	y	-	-	-	-	-	-	-	-	-	-	-
71	1026634	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
72	1191735	-	-	y	y	y	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
73	1201579	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
74	632509	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
75	1034139	y	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
76	209577	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
77	1236314	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
78	1225022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
79	1195673	y	-	y	-	-	-	y	y	-	-	-	-	-	-	-	-	-	-	-	-
80	1244680	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
81	1239758	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
82	1240583	-	-	y	-	-	-	y	y	-	-	-	-	-	-	-	-	y	-	-	-
83	1221576	y	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84	1225022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
85	1222541	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
86	1266210	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
87	1271328	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
88	1123830	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
89	1227216	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
90	1214769	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
91	1278601	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
92	968727	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
93	632509	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
94	1246568	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
95	1239393	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
96	969665	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Sr. No	MRD NO	Breathlessness	Breathlessness At presentation	Breathlessness During hospital stay	CNS symptoms	Seizures	Seizures At presentation	Seizures During hospital stay	Altered Sensorium	Altered Sensorium At presentation	Altered Sensorium During hospital stay	Musculo-skeletal symptoms	Myalgias	Myalgias At presentation	Myalgias During hospital stay	Bony pains	Bony pains At presentation	Bony pains During hospital stay	Others	Tachycardia
64	1034748	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
65	1152070	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
66	1201883	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
67	311381	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	y
68	1227216	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
69	1114282	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Eye discharge	y
70	1121402	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	y
71	1026634	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
72	1191735	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	y
73	1201579	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	y
74	632509	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
75	1034139	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
76	209577	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
77	1236314	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
78	1225022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
79	1195673	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	y
80	1244680	-	-	-	-	-	-	-	-	-	-	y	y	y	-	-	-	-	-	-
81	1239758	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
82	1240583	y	y	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	y
83	1221576	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84	1225022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
85	1222541	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
86	1266210	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
87	1271328	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
88	1123830	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
89	1227216	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
90	1214769	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
91	1278601	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
92	968727	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
93	632509	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
94	1246568	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
95	1239393	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
96	969665	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Sr. No	MRD NO	Tachycardia At presentation	Tachycardia During hospital stay	Tachypnea	Tachypnea At presentation	Tachypnea During hospital stay	Hypotension	Hypotension At presentation	Hypotension During hospital stay	De-saturation (<90%)	De-saturation (<90%) At presentation	De-saturation (<90%) During hospital stay	Prolonged CFT (>2sec)	Prolonged CFT (>2sec) At presentation	Prolonged CFT (>2sec) During hospital stay	TLC (103/uL) Day of admission	TLC (103/uL) Day of discharge	DLC-N (%) Day of admission	DLC-L (%) Day of admission
64	1034748	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.7	1.9	35	58
65	1152070	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.3	0.7	15	63
66	1201883	-	-	y	-	y	-	-	-	-	-	-	-	-	-	2.6	2	38	58
67	311381	-	y	y	-	y	-	-	-	-	-	-	-	-	-	0.4	3	2	2
68	1227216	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7.9	2.7	21	75
69	1114282	-	y	y	-	y	y	-	y	-	-	-	-	-	-	0.7	2.9	12	81
70	1121402	-	y	y	-	y	-	-	-	-	-	-	-	-	-	0.6	7.7	3	94
71	1026634	-	-	y	-	y	-	-	-	-	-	-	-	-	-	1	3.7	26	60
72	1191735	y	-	y	-	y	y	-	y	-	-	-	-	-	-	0.5	5.3	15	80
73	1201579	y	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1.6	41	49
74	632509	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.9	3	1	96
75	1034139	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.5	5	89	4
76	209577	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.2	4.1	40	50
77	1236314	-	-	-	-	-	y	y	-	-	-	-	-	-	-	0.8	4.1	15	67
78	1225022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.2	0.6	52	45
79	1195673	y	-	y	y	-	y	-	y	y	-	y	y	-	y	0.2	0.1	12	77
80	1244680	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.9	4.4	12	80
81	1239758	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.3	1.8	2	7
82	1240583	-	y	y	y	-	-	-	-	-	-	-	-	-	-	1	1.6	11	83
83	1221576	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.2	2.4	3	7
84	1225022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.2	5.1	1	4
85	1222541	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.6	2.6	10	85
86	1266210	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.6	6.4	21	68
87	1271328	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	1.6	23	74
88	1123830	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.8	2.3	46	40
89	1227216	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.4	1.8	20	72
90	1214769	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.6	5.4	46	47
91	1278601	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.2	3.4	2	95
92	968727	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.3	0.9	48	29
93	632509	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.2	1.3	46	37
94	1246568	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.2	0.7	31	74
95	1239393	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.6	3.8	6	91
96	969665	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.5	0.2	12	86

Sr. No	MRD NO	DLC-N (%) Day of discharge	DLC-L (%) Day of discharge	ANC (per mm3) Day of admission	ANC (per mm3) Day of discharge	Grade of neutropenia	Day 3	Day 5	Day 7	Day 9	Day 11	Day 13	Duration of neutropenia (<500/mm3)	Platelets (103/uL) Day of admission	Platelets (103/uL) Day of discharge	MPV (fL) Day of admission	MPV (fL) Day of discharge	Hb (gm/dl) Day of admission	Hb (gm/dl) Day of discharge	RBC count (106/uL) Day of admission	RBC count (106/uL) Day of discharge	PCV (%) Day of admission	PCV (%) Day of discharge	MCV (fL) Day of admission
64	1034748	14	74	245	266	4	4	4	4	0	0	0	7	144	240	9.6	9.6	8.8	10.3	2.93	3.42	28.1	32.6	96
65	1152070	4	5	45	28	4	4	4	0	0	0	0	5	15	42	8.3	9.4	8.3	9.8	3.02	3.36	25.5	29.8	84.4
66	1201883	14	72	928	280	3	4	4	0	0	0	0	5	124	175	11	9.4	9.3	7.4	3.46	2.79	30	23.8	86.6
67	311381	68	18	8	2040	4	4	2	1	1	0	0	4	159	213	9.1	11.4	9.3	8	2.7	2.34	29.3	24.6	108.3
68	1227216	15	81	1659	405	1	3	3	4	0	0	0	4	92	65	8.3	7.5	14.7	11.7	5.51	4.09	46.4	34	84.3
69	1114282	34	46	84	986	4	2	4	4	2	0	0	8	201	401	8.6	7.9	7.6	11.4	2.51	3.75	23.4	33.1	93.4
70	1121402	68	17	18	5236	4	4	4	4	4	2	1	9	65	536	9	7.4	9.1	10.9	3.17	3.85	27.4	33.5	86.2
71	1026634	40	45	260	1480	4	4	3	2	2	0	0	4	161	333	8.5	7.9	9.5	11.5	3.13	3.62	29.6	33.7	94.6
72	1191735	65	97	75	3445	4	4	4	4	2	2	1	7	27	100	7.4	8.8	4.5	8.8	1.73	2.98	13.4	24.1	77.3
73	1201579	22	73	410	352	4	4	0	0	0	0	0	3	10	34	9.8	8.8	7.4	12.7	2.62	4.68	20.8	39	79.3
74	632509	86	10	9	2580	4	4	4	4	1	0	0	7	41	442	9.4	8.4	12.3	10.5	3.93	3.21	37.5	30.3	95.4
75	1034139	13	73	1335	650	2	3	4	4	3	3	3	4	201	162	9.6	7.5	9.5	14.3	3.23	4.48	30.3	42.3	93.7
76	209577	40	50	480	1640	4	2	1	0	0	0	0	2	289	311	7.4	7	10	10.2	3.16	3.11	31	30.1	98.1
77	1236314	66	26	120	2706	4	2	1	1	1	0	0	2	32	219	9.8	9.9	7.9	8.2	3.07	3.23	25.1	26	81.7
78	1225022	82	13	104	492	4	4	4	4	1	1	4	8	16	207	9.7	7.9	8	8.3	2.99	2.99	25	25.6	83.6
79	1195673	1	4	24	1	4	4	4	0	0	0	0	6	5	10	7.4	7.8	8.9	9.3	3.12	3.27	27.3	28.6	87.6
80	1244680	59	32	108	2596	4	4	3	2	1	1	1	4	108	594	9	7.5	9.6	8.6	3.62	3.19	29.3	26	80.9
81	1239758	40	50	6	720	4	4	4	4	4	3	0	9	51	367	8.3	8.4	8.1	9.7	2.9	3.43	25	29.9	86.2
82	1240583	16	70	110	256	4	4	4	0	0	0	0	5	102	214	11.7	9.1	8.9	6.9	3.52	2.64	27.6	20.3	78.4
83	1221576	61	27	6	1464	4	4	4	4	4	4	2	10	10	52	8.7	9.4	10.3	9.5	3.68	3.37	30.8	28.8	83.7
84	1225022	72	16	2	3672	4	4	1	1	1	1	0	3	22	142	8.2	8.4	7.5	8.6	2.56	3.14	21.8	28	85.2
85	1222541	37	50	160	962	4	4	4	3	4	2	3	14	24	168	10.5	8.5	7.6	9.2	3.18	3.24	24.5	28.8	77.1
86	1266210	50	38	126	3200	4	4	1	1	1	0	0	4	24	186	9.8	8.2	11.9	9.7	4.63	3.85	36.2	29.8	78
87	1271328	62	34	460	992	4	4	4	4	4	3	0	9	74	298	9.5	9.7	9.9	9.2	3.34	2.78	30.6	25.8	91.5
88	1123830	27	53	368	621	4	3	3	0	0	0	0	2	277	213	8	8.7	12.5	11.1	3.77	3.37	36.3	33.5	96.4
89	1227216	27	58	800	486	3	4	4	4	2	4	0	5	23	193	7.8	8.1	10.1	9.2	3.52	3.31	29.4	28.2	83.6
90	1214769	55	30	276	2970	4	4	4	4	1	0	0	7	28	376	8.7	8.7	8	13.4	2.75	4.45	24.6	41.2	89.6
91	1278601	56	30	4	1904	4	4	4	4	4	4	1	12	11	14	10.3	10	10.5	13.7	3.84	4.71	31.4	40.6	81.9
92	968727	59	21	624	531	3	4	3	0	0	0	0	1	164	158	10.5	9.7	9.7	11.1	3.32	3.18	32.1	29.8	96.6
93	632509	16	71	92	208	4	4	4	4	0	0	0	8	28	248	9.9	9.4	7.9	9.4	2.59	3.08	24.1	29.3	93.1
94	1246568	3	6	62	21	4	4	4	4	0	0	0	7	27	118	7.4	8.8	8.2	12.3	2.94	4.24	24.8	29.6	84.4
95	1239393	5	79	96	190	4	4	4	4	4	0	0	9	46	23	8.8	8.9	7	8.7	2.41	2.91	22.5	26.2	93.5
96	969665	1	3	60	2	4	4	4	4	4	0	0	9	20	12	9.3	8.4	8.6	9.4	8.6	9.4	3.07	3.17	83.1

Sr. No	MRD NO	MCV (fL) Day of discharge	MCH (Pg) Day of admission	MCH (Pg) Day of discharge	MCHC (gm/dl) Day of admission	MCHC (gm/dl) Day of discharge	RDW (%) Day of admission	RDW (%) Day of discharge	PCT (ng/ml) Day 1	PCT (ng/ml) Day 3	PCT (ng/ml) Day 5	PCT (ng/ml) Day 7	PCT (ng/ml) Day 9	PCT (ng/ml) Day 11	PCT (ng/ml) Day 13	CRP (mg/lt) Day 1	CRP (mg/lt) Day 3	CRP (mg/lt) Day 5	CRP (mg/lt) Day 7	CRP (mg/lt) Day 9	CRP (mg/lt) Day 11	CRP (mg/lt) Day 13	Urea (mg/dl) Day of admission	Urea (mg/dl) Day of discharge	Creatinine (mg/dl) Day of admission	Creatinine (mg/dl) Day of discharge
64	1034748	95.2	29.9	30	31.2	31.5	17	18.9	0.81	-	2.29	-	-	-	-	35.21	-	10.22	-	-	-	-	19	-	0.4	-
65	1152070	88.7	27.4	29.2	32.5	33	14.9	19.1	0.23	-	-	-	-	-	-	23.7	-	-	-	-	-	-	15	14	0.24	0.17
66	1201883	85.4	26.9	26.8	31.1	31.3	16.4	16.4	0.07	-	-	-	-	-	-	0.08	-	-	-	-	-	-	13	-	0.15	-
67	311381	105.2	34.3	34.3	31.6	32.6	18	18.1	10.9	-	-	-	-	-	-	128.04	-	149.64	-	-	-	-	-	-	0.25	-
68	1227216	83.2	26.7	28.2	31.7	34.4	15.1	14.3	0.39	-	-	-	-	-	-	52.18	-	-	-	-	-	-	32	-	0.18	-
69	1114282	88.2	30.1	30.3	32.3	34.3	17.3	15.6	5.43	-	-	-	-	-	-	169.76	-	163.85	-	115.47	-	41.67	19	8	0.18	0.16
70	1121402	87.1	28.2	28.4	33.2	32.6	15.4	14.4	0.33	-	46.9	-	-	-	-	22.2	6.14	34.9	64.25	127.12	33.59	-	19	6	0.14	0.18
71	1026634	93	30.4	31.7	32.2	34.1	17.1	19.2	0.59	-	-	-	-	-	-	34.98	-	30.79	-	-	-	-	26	-	0.13	-
72	1191735	80.8	25.8	29.4	33.4	36.4	15.8	17.8	1.86	-	-	-	-	-	-	46.19	-	-	-	-	-	-	27	8	0.1	0.12
73	1201579	83.3	28.3	27.1	35.6	32.5	13.8	13.4	0.11	-	-	-	-	-	-	2.92	-	2.49	-	-	-	-	12	-	0.22	-
74	632509	94.4	31.2	32.6	32.7	34.5	14.1	13.6	0.5	-	-	-	-	-	-	121.83	-	-	-	-	-	-	27	-	0.52	-
75	1034139	94.5	29.4	32	31.4	33.9	18.4	19.2	0.19	-	-	-	-	-	-	0.83	-	14.01	-	9.83	-	12.11	32	-	0.27	-
76	209577	97	31.8	32.8	32.4	33.8	18	17.4	0.23	-	-	-	-	-	-	26.9	-	-	-	-	-	-	21	-	0.27	-
77	1236314	80.6	25.8	25.3	31.6	31.4	18.2	18.8	0.45	-	-	-	-	-	-	-	-	-	-	-	-	-	29	8	0.54	0.42
78	1225022	85.4	26.7	27.6	32	32.3	22.4	14.5	0.33	-	0.27	-	-	-	-	39.5	-	100.73	-	43.96	-	-	16	-	0.32	-
79	1195673	87.6	28.5	28.4	32.5	32.4	19.7	18.4	-	-	-	-	-	-	-	331.76	-	119.49	-	-	-	-	56	24	0.76	0.6
80	1244680	81.3	26.5	26.8	32.8	32.9	13.2	14.5	-	-	-	-	-	-	-	23.6	-	48.78	-	62.95	-	-	25	8	0.6	0.62
81	1239758	87.2	28.1	28.3	32.6	32.5	17.4	17.8	0.15	-	-	-	-	-	-	30.8	-	28.53	-	30.48	-	111.61	27	6	0.31	0.32
82	1240583	77	25.3	25.5	26.3	32.3	34.2	21.3	20.3	0.11	-	-	-	-	-	3.44	-	7.78	-	-	-	-	5	-	0.37	-
83	1221576	85.4	27.9	28.1	33.4	32.9	13.7	15	0.31	-	-	-	-	-	-	26.04	-	63.11	-	-	-	-	21	4	0.22	0.17
84	1225022	89.1	29.1	27.5	34.2	30.9	13.7	14.9	0.29	-	-	-	-	-	-	40.12	-	14.12	-	-	-	-	13	5	0.24	0.24
85	1222541	89	23.9	28.5	31	32.1	20.5	25.5	0.49	-	-	-	-	-	-	227.62	-	55.14	-	64.03	-	153.27	23	9	0.26	0.36
86	1266210	77.5	25.6	25.1	32.8	32.5	15.7	15.4	30.36	-	-	-	-	-	-	87.39	-	-	-	-	-	-	20	7	0.28	0.21
87	1271328	92.8	29.5	33	32.3	35.5	18.9	19.1	-	-	-	-	-	-	-	14.29	-	1	-	-	-	-	54	-	0.49	-
88	1123830	99.6	33.2	33	34.5	33.1	17.4	18.1	2.66	-	-	-	-	-	-	4.78	-	-	-	-	-	-	20	-	0.27	-
89	1227216	85.3	28.6	27.9	34.2	32.8	13.9	14	31	-	-	-	-	-	-	5.83	-	30.37	-	68.02	-	3.06	18	9	0.22	0.18
90	1214769	92.6	29.1	30.2	32.5	32.6	15.5	15.5	2.82	-	0.49	-	-	-	-	70.09	-	-	-	-	-	-	24	6	0.26	0.19
91	1278601	86.2	27.4	29	33.5	33.7	17	15.6	0.13	-	0.34	-	-	-	-	13.85	-	53.08	-	102.4	-	-	5	4	0.07	0.11
92	968727	94	29.3	31.1	30.3	33.1	17.4	16.7	0.652	-	-	-	-	-	-	36.81	-	-	-	-	-	-	12	-	0.25	-
93	632509	95.2	30.4	30.4	32.6	31.9	15.4	15.8	0.99	-	-	-	-	-	-	32.75	-	57.74	-	-	-	-	23	-	0.61	-
94	1246568	86.8	27.8	29.4	32.9	33.9	14.1	15	4.76	-	-	-	-	-	-	56.32	-	59.64	-	-	-	-	14	-	0.21	-
95	1239393	90	29.2	29.9	31.2	33.2	20.6	17.3	0.77	-	-	-	-	-	-	6.25	-	51.62	-	12.66	-	-	18	-	0.12	-
96	969665	90	28.2	29.6	33.9	32.9	13.4	14.5	0.25	-	-	-	-	-	-	86.06	-	-	-	-	-	-	18	9	0.28	0.19

Sr. No	MRD NO	Na Day of admission	K Day of admission	CL Day of admission	Na Day of discharge	K Day of discharge	CL Day of discharge	T.BIL Day of admission	D.BIL (mg/dl) Day of admission	T.BIL (mg/dl) Day of discharge	D.BIL (mg/dl) Day of discharge	SGOT Day of admission	SGPT (U/L) Day of admission	SGOT(U/L) Day of discharge	SGPT (U/L) Day of discharge	ALP (U/L) Day of admission	ALP (U/L) Day of discharge	T.Proteins (g/dl) Day of admission	T.Proteins (g/dl) Day of discharge	S.Albumin (g/dl) Day of admission	S.Albumin (g/dl) Day of discharge
64	1034748	129	4.35	93	-	-	-	0.42	0.16	-	-	33	36	-	-	163	-	5.8	-	3.67	-
65	1152070	135	3.42	102	139	3.96	105	0.43	0.19	-	-	23	32	-	-	181	-	6.6	-	4.33	-
66	1201883	134	4.42	100	-	-	-	0.11	0.04	-	-	72	118	-	-	96	-	6.4	-	4.41	-
67	311381	-	-	-	-	-	-	-	-	-	-	48	68	-	-	-	-	-	-	-	-
68	1227216	134	4.16	99	-	-	-	1.04	0.19	-	-	27	27	-	-	156	-	5.4	-	3.5	-
69	1114282	130	4.1	95	135	3.57	100	0.75	0.32	-	-	20	30	-	-	119	-	6	-	4.19	-
70	1121402	136	3.23	102	135	3.9	105	0.55	0.25	-	-	46	62	-	-	123	-	5.2	-	3.72	-
71	1026634	137	3.95	105	-	-	-	0.53	0.06	-	-	8	70	-	-	247	-	5.4	-	3.98	-
72	1191735	130	3.17	95	139	2.29	116	1.28	0.43	-	-	35	108	-	-	138	-	5.4	-	3.4	-
73	1201579	140	4.27	106	-	-	-	0.52	0.11	-	-	31	37	-	-	113	-	5.7	-	4.1	-
74	632509	137	4.53	101	-	-	-	0.61	0.29	-	-	30	32	-	-	187	-	6.2	-	3.96	-
75	1034139	137	4.24	97	-	-	-	1.08	0.43	-	-	43	51	-	-	171	-	5.6	-	4.09	-
76	209577	137	3.95	103	-	-	-	0.85	0.15	-	-	25	71	-	-	115	-	6.6	-	4.33	-
77	1236314	131	3.35	91	135	3.56	97	0.58	0.14	0.38	0.11	26	24	31	10	57	153	6.3	5.7	3.67	3.37
78	1225022	135	3.87	104	-	-	-	0.53	0.11	-	-	29	38	-	-	104	-	6.4	-	4.01	-
79	1195673	132	2.87	94	151	4.08	121	-	-	-	-	-	-	-	-	-	-	-	-	1.66	-
80	1244680	133	4.26	97	140	3.5	102	0.38	0.08	-	-	28	20	-	-	107	-	5.6	-	3.03	-
81	1239758	138	4.02	103	141	4.75	102	1.61	0.34	0.94	0.25	77	157	88	175	49	55	5.2	5.1	3.66	3.35
82	1240583	141	3.98	105	-	-	-	0.76	0.22	-	-	116	120	-	-	218	-	5.1	-	3.33	-
83	1221576	129	4.17	94	139	3.91	100	2.53	0.54	-	-	66	110	-	-	116	-	5.3	-	3.82	-
84	1225022	139	3.7	106	142	2.87	115	0.64	0.13	0.16	0.04	81	88	25	18	101	48	6.4	3.4	4.07	2.12
85	1222541	132	4.56	97	135	4.17	97	0.45	0.16	1.2	0.37	23	31	29	61	169	187	6.4	5.7	4.78	3.79
86	1266210	131	3.74	98	137	2.94	102	0.66	0.19	-	-	33	25	-	-	190	-	6.9	-	4.01	-
87	1271328	130	4.41	93	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
88	1123830	140	4.14	105	-	-	-	1.88	0.39	-	-	93	108	-	-	128	-	6.2	-	4.27	-
89	1227216	137	4.32	102	138	4	104	-	-	-	-	-	-	-	-	-	-	-	-	-	-
90	1214769	133	3.59	96	132	2.78	101	0.72	0.35	-	-	17	23	-	-	111	-	6.1	-	3.86	-
91	1278601	137	3.32	107	136	4.42	98	0.28	0.11	0.52	0.11	47	22	30	13	84	88	5.1	4.7	3.19	2.99
92	968727	140	3.64	106	-	-	-	0.56	0.16	-	-	42	80	-	-	164	-	5.9	-	3.97	-
93	632509	134	3.82	99	-	-	-	0.69	0.26	-	-	71	69	-	-	217	-	4.6	-	3.03	-
94	1246568	143	4.27	109	-	-	-	1.32	0.75	-	-	66	51	-	-	147	-	4.5	-	3	-
95	1239393	141	3.78	110	-	-	-	0.38	0.1	-	-	55	101	-	-	101	-	5	-	3.2	-
96	969665	129	4.31	95	141	2.98	110	0.74	0.17	0.2	0.14	30	24	7	5	115	71	8.2	4.6	4.06	2.17

Sr. No	MRD NO	Blood Culture	Urine routine	Urine culture	Chest X-ray	Galactomannan	Clostridium difficile
64	1034748	ng	normal	ng	NAD	-	-
65	1152070	ng	normal	ng	NAD	-	-
66	1201883	ng	normal	ng	OPACITIES	-	-
67	311381	ng	normal	ng	CONSOLIDATION, PLEURAL EFFUSION	-	-
68	1227216	ng	normal	ng	NAD	-	neg
69	1114282	ng	pus cells	ng	NAD	pos	-
70	1121402	ng	pus cells	ng	OPACITIES	-	neg
71	1026634	ng	normal	ng	Increased Broncho-vascular markings	-	-
72	1191735	ng	pus cells	Positive (E.coli)	NAD	-	neg
73	1201579	ng	normal	ng	NAD	-	-
74	632509	ng	pus cells	ng	NAD	-	-
75	1034139	ng	normal	ng	NAD	neg	-
76	209577	ng	normal	ng	NAD	-	-
77	1236314	ng	normal	Positive (Klebsiella ozaenae)	OPACITIES	-	-
78	1225022	Positive (Enterobacter cloacae)	normal	ng	NAD	pos	-
79	1195673	Positive (MRSA)	normal	ng	OPACITIES	-	-
80	1244680	Positive (E.coli)	normal	ng	NAD	neg	-
81	1239758	ng	normal	ng	NAD	neg	-
82	1240583	ng	normal	ng	NAD	-	-
83	1221576	ng	normal	ng	NAD	-	-
84	1225022	ng	normal	ng	NAD	-	-
85	1222541	ng	normal	ng	NAD	neg	-
86	1266210	Positive (MRSA)	normal	ng	OPACITIES	-	-
87	1271328	ng	normal	ng	NAD	-	-
88	1123830	ng	normal	ng	NAD	-	-
89	1227216	ng	normal	ng	NAD	neg	neg
90	1214769	ng	normal	ng	NAD	-	-
91	1278601	ng	pus cells	ng	NAD	neg	positive
92	968727	ng	normal	ng	NAD	-	-
93	632509	ng	normal	ng	NAD	pos	-
94	1246568	ng	normal	ng	NAD	neg	-
95	1239393	ng	normal	ng	NAD	neg	-
96	969665	ng	normal	ng	NAD	-	-

Sr. No	MRD NO	Others	Date & time of onset of fever	Date & time of arrival to hospital	Duration b/w onset of Fever & Arrival to Hospital	Time of administration of antibiotics	Duration b/w Arrival & Anitibotics Administration	Delay	before arrival to hospital	after arrival to hospital	Cause_non availability of transport	Cause_Ingestion of NSAID at home
64	1034748	-	02/01/22, 11 am	02/01/22, 12:30 pm	90	02/01/22, 12:55 pm	25	y	y	-	y	-
65	1152070	COVID positive	12/01/22, 3 pm	12/01/22, 3:50 pm	50	12/01/22, 4 pm	10	n	-	-	-	-
66	1201883	CT Chest-NAD, COVID positive	15/01/22, 9:30 am	15/01/22, 9:50 am	20	15/01/22, 10:20 am	40	n	-	-	-	-
67	311381	CT Chest-Consolidation, Cavitation, COVID positive	21/01/22, 3:30 am	21/01/22, 8 am	270	21/01/22, 8:20 am	20	y	y	-	y	-
68	1227216	-	22/01/22, 07:20 am	22/01/22, 07:50 am	30	22/01/22, 08:15 am	25	n	-	-	-	-
69	1114282	CT Orbit-NAD	02/02/22, 11:30 am	02/02/22, 06:30 pm	420	02/02/22, 07:10 pm	40	y	y	-	y	-
70	1121402	CT Chest- Small air space nodules at basal segments bilateral lower lobes, COVID positive	03/01/22, 10:30 am	03/01/22, 02:30 pm	240	03/01/22, 02:50 pm	20	y	y	-	y	-
71	1026634	COVID positive	03/02/22, 06:30 pm	04/02/22, 5 pm	1350	04/02/22, 05:30 pm	30	y	y	-	-	y
72	1191735	-	14/02/22, 6 pm	14/02/22, 8 pm	120	14/02/22, 08:40 pm	40	y	y	-	y	-
73	1201579	-	14/02/22, 11:00 am	14/02/22, 11:45 am	45	14/02/22, 12:10 pm	25	n	-	-	-	-
74	632509	-	15/02/22, 6 pm	15/02/22, 07:10 pm	70	15/02/22, 07:30 pm	20	y	y	-	y	-
75	1034139	-	04/03/22, 06:30 am	04/03/22, 08:50 am	140	04/03/22, 9:40 am	50	y	y	-	y	-
76	209577	-	09/03/22, 11:30 am	09/03/22, 02:50 pm	200	09/03/22, 03:40 pm	50	y	y	-	y	-
77	1236314	CT Chest- Bilateral pulmonary nodules s/o metastases	09/03/22, 06:50 am	09/03/22, 09:10 am	140	09/03/22, 09:40 am	30	y	y	-	-	-
78	1225022	-	11/03/22, 07:50 pm	11/03/22, 11:50 pm	240	12/03/22, 12:30 am	40	y	y	-	y	-
79	1195673	-	16/03/22, 05:30 am	16/03/22, 11:30 am	360	16/03/22, 12:10 pm	40	y	y	-	y	-
80	1244680	-	18/03/22, 11:10 am	18/03/22, 01:30 am	140	18/03/22, 02:15 pm	45	y	y	-	-	-
81	1239758	-	19/03/22, 10:15 pm	20/03/22, 09:10 am	660	20/03/22, 09:55 am	45	y	y	-	-	y
82	1240583	-	21/03/22, 04:30 pm	21/03/22, 05:10 pm	40	21/03/22, 05:20 pm	10	n	-	-	-	-
83	1221576	-	21/03/22, 09:30 pm	22/03/22, 10:30 am	780	22/03/22, 11:15 am	45	y	y	-	-	-
84	1225022	-	28/03/22, 07:30 pm	28/03/22, 11:30 pm	240	28/03/22, 11:50 pm	20	y	y	-	y	-
85	1222541	-	30/03/22, 05:30 am	30/03/22, 08:50 am	200	30/03/22, 09:15 am	25	y	y	-	y	-
86	1266210	-	31/03/22, 06:30 am	31/03/22, 11:30 am	300	31/03/22, 12:10 pm	40	y	y	-	-	y
87	1271328	-	02/04/22, 05:30 pm	02/04/22, 06:20 pm	50	02/04/22, 06:50 pm	30	n	-	-	-	-
88	1123830	-	03/04/22, 10:00 am	03/04/22, 10:20 am	20	03/04/22, 10:50 am	30	n	-	-	-	-
89	1227216	-	07/04/22, 03:30 pm	07/04/22, 04:50 pm	80	07/04/22, 05:30 am	40	y	y	-	y	-
90	1214769	-	08/04/22, 06:30 am	08/04/22, 11:15 am	285	08/04/22, 12:20 pm	65	y	y	-	y	y
91	1278601	-	08/04/22, 01:30 pm	inpatient	-	08/04/22, 01:50 pm	20	n	-	-	-	-
92	968727	-	09/04/22, 10:30 am	inpatient	-	09/04/22, 11:20 am	50	n	-	-	-	-
93	632509	-	11/04/22, 7 am	11/04/22, 09:30 am	150	11/04/22, 10:20 am	50	y	y	-	y	-
94	1246568	-	12/04/22, 05:30 pm	12/04/22, 7 pm	90	12/04/22, 07:45 pm	45	y	y	-	y	-
95	1239393	-	11/04/22, 11:30 am	11/04/22, 12:15 pm	45	11/04/22, 12:30 pm	15	n	-	-	-	-
96	969665	-	13/04/22, 04:00 pm	inpatient	-	13/04/22, 5 pm	60	y	-	y	-	-

Sr. No	MRD NO	Cause Unawareness of situation	Cause Hospital related	Time to defervescence (days)	Antibiotics given	Duration of antibiotics (days)	Need to step up antibiotics 2nd line	Need to step up antibiotics 3th line line	Fungal infection	Possible	Probable	Proven	Need of Anti-Fungals	Need of Anti-virals	Requirement of Oxygen
64	1034748	-	-	7	Magnex, Amikacin	8	-	-	-	-	-	-	-	-	-
65	1152070	-	-	5	Magnex, Amikacin	5	-	-	-	-	-	-	-	-	-
66	1201883	-	-	3	Magnex, Amikacin	5	-	-	y	y	-	-	y	-	-
67	311381	-	-	7	Magnex, Amikacin	10	y (Meropenem, Vancomycin)	-	y	-	y	-	y	-	y
68	1227216	-	-	4	Magnex, Amikacin	5	y (Metronidazole)	-	-	-	-	-	-	-	-
69	1114282	-	-	7	Magnex, Amikacin	8	y (Meropenem, Vancomycin)	-	y	y	-	-	y	-	y
70	1121402	-	-	18	Magnex, Amikacin	20	y (Meropenem, Vancomycin)	y (Colistin)	y	-	y	-	y	-	y
71	1026634	-	-	10	Magnex, Amikacin	14	y (Meropenem, Vancomycin)	-	y	y	-	-	-	-	-
72	1191735	-	-	12	Magnex, Amikacin	14	y (Meropenem, Vancomycin)	-	y	y	-	-	y	-	y
73	1201579	-	-	3	Magnex, Amikacin	5	-	-	-	-	-	-	-	-	-
74	632509	-	-	7	Magnex, Amikacin	7	y (Meropenem)	-	y	y	-	-	y	-	-
75	1034139	-	-	12	Magnex, Amikacin	14	y (Meropenem, Vancomycin)	-	y	y	-	-	-	-	-
76	209577	-	-	3	Magnex, Amikacin	3	-	-	-	-	-	-	-	-	-
77	1236314	y	-	10	Magnex, Amikacin	10	y (Fosfomycin, Vancomycin)	-	y	y	-	-	y	-	-
78	1225022	-	-	12	Magnex, Amikacin	14	y (Meropenem, Vancomycin)	-	y	y	-	-	y	-	-
79	1195673	-	-	MORTALITY	Magnex, Amikacin	5	y (Meropenem, Vancomycin)	y (Teicoplanin, Clindamycin)	y	y	-	-	y	-	y
80	1244680	y	-	15	Magnex, Amikacin	15	y (Piptaz, Ciprofloxacin)	y (Piptaz, Ciprofloxacin)	y	y	-	-	-	-	-
81	1239758	y	-	10	Magnex, Amikacin	12	y (Meropenem, Vancomycin)	-	y	y	-	-	y	-	-
82	1240583	-	-	5	Magnex, Amikacin	5	-	-	-	-	-	-	-	-	y
83	1221576	y	-	10	Magnex, Amikacin	12	y (Meropenem, Vancomycin)	-	y	y	-	-	y	-	-
84	1225022	-	-	10	Magnex, Amikacin	12	y (Meropenem, Vancomycin)	-	-	-	-	-	-	-	-
85	1222541	-	-	14	Magnex, Amikacin	14	y (Meropenem, Vancomycin)	-	y	y	-	-	y	-	-
86	1266210	-	-	5	Magnex, Amikacin	7	y (Meropenem)	-	-	-	-	-	-	-	-
87	1271328	-	-	12	Magnex, Amikacin	14	y (Meropenem, Vancomycin)	-	-	-	-	-	-	-	-
88	1123830	-	-	5	Magnex, Amikacin	5	-	-	-	-	-	-	-	-	-
89	1227216	-	-	10	Magnex, Amikacin	14	y (Meropenem, Vancomycin)	-	-	-	-	-	-	-	-
90	1214769	-	-	7	Magnex, Amikacin	10	-	-	-	-	-	-	-	-	-
91	1278601	-	-	10	Magnex, Amikacin	10	y (Ciprofloxacin, Meropenem)	-	-	-	-	-	-	-	-
92	968727	-	-	3	Magnex, Amikacin	3	-	-	-	-	-	-	-	-	-
93	632509	-	-	7	Magnex, Amikacin	7	y (Meropenem, Vancomycin)	-	-	-	-	-	-	-	-
94	1246568	-	-	7	Magnex, Amikacin	7	-	-	-	-	-	-	-	-	-
95	1239393	-	-	7	Magnex, Amikacin	7	-	-	y	y	-	-	y	-	-
96	969665	-	y	5	Magnex, Amikacin	5	-	-	-	-	-	-	-	-	y

Sr. No	MRD NO	Requirement of Ventilation	non-invasive	Invasive	Requirement of Inotropes	Inotrope given	Inotropes No.of days	Requirement of PICU	PICU Duration of stay (days)	Requirement of blood products	Packed cell (PC)	RDP	OUT COME Recovery	with in 1 week	> 1 week	DAMA	Mortality	Shifted to PICU	Duration of hospital stay (days)
64	1034748	-	-	-	-	-	-	-	-	-	-	-	y	-	y	-	-	-	8
65	1152070	-	-	-	-	-	-	-	-	y	1	-	y	y	-	-	-	-	5
66	1201883	-	-	-	-	-	-	-	-	y	1	-	y	y	-	-	-	-	5
67	311381	-	-	-	-	-	-	-	-	y	1	-	y	-	y	-	-	-	11
68	1227216	-	-	-	-	-	-	-	-	-	-	-	y	y	-	-	-	-	5
69	1114282	-	-	-	-	-	-	-	-	y	1	-	y	-	y	-	-	-	8
70	1121402	-	-	-	-	-	-	-	-	y	1	1	y	-	y	-	-	-	19
71	1026634	-	-	-	-	-	-	-	-	-	-	-	y	-	y	-	-	-	14
72	1191735	-	-	-	-	-	-	-	-	y	5	3	y	-	y	-	-	-	14
73	1201579	-	-	-	-	-	-	-	-	-	-	-	y	y	-	-	-	-	5
74	632509	-	-	-	-	-	-	-	-	-	-	-	y	-	y	-	-	-	8
75	1034139	-	-	-	-	-	-	-	-	y	1	-	y	-	y	-	-	-	15
76	209577	-	-	-	-	-	-	-	-	-	-	-	y	y	-	-	-	-	4
77	1236314	-	-	-	-	-	-	-	-	y	-	1	y	-	y	-	-	-	12
78	1225022	-	-	-	-	-	-	-	-	y	1	1	y	-	y	-	-	-	15
79	1195673	y	y	y	y	Nor-epinephrine, Epinephrine	2	y	2	y	2	4	-	-	-	-	y	y	5
80	1244680	-	-	-	-	-	-	-	-	y	1	1	y	-	y	-	-	-	16
81	1239758	-	-	-	-	-	-	-	-	y	1	1	y	-	y	-	-	-	12
82	1240583	-	-	-	-	-	-	-	-	y	1	-	y	y	-	-	-	-	6
83	1221576	-	-	-	-	-	-	-	-	y	1	3	y	-	y	-	-	-	15
84	1225022	-	-	-	-	-	-	-	-	y	1	2	y	-	y	-	-	-	12
85	1222541	-	-	-	-	-	-	-	-	y	1	1	y	-	y	-	-	-	20
86	1266210	-	-	-	-	-	-	-	-	y	-	1	y	-	y	-	-	-	9
87	1271328	-	-	-	-	-	-	-	-	-	-	-	y	-	y	-	-	-	14
88	1123830	-	-	-	-	-	-	-	-	-	-	-	y	y	-	-	-	-	5
89	1227216	-	-	-	-	-	-	-	-	y	1	1	y	-	y	-	-	-	14
90	1214769	-	-	-	-	-	-	-	-	-	-	-	y	-	y	-	-	-	13
91	1278601	-	-	-	-	-	-	-	-	y	1	2	y	-	y	-	-	-	14
92	968727	-	-	-	-	-	-	-	-	-	-	-	y	y	-	-	-	-	4
93	632509	-	-	-	-	-	-	-	-	-	-	-	y	-	y	-	-	-	8
94	1246568	-	-	-	-	-	-	-	-	y	1	-	y	y	-	-	-	-	7
95	1239393	-	-	-	-	-	-	-	-	y	1	1	y	-	y	-	-	-	8
96	969665	y	y	-	-	-	-	-	-	y	1	3	y	y	-	-	-	-	6

Baba Farid University
of Health Sciences
Sadiq Road
Faridkot-151 203 (Pb). INDIA.
Phone : 01639-256232,256236
Tele/Fax : 01639-256235
Email – Examination@bfuhs.ac.in

No. BFUHS/2K21p-TH/ 2-8 Date 6/12/22

The Principal,
DMC, Ludhiana.

Subject: **Approval of Plan of Thesis.**

This is to inform you that the Faculty of Medical Sciences in its meeting held on 29.10.2021 has approved the plan of thesis of **Mitali Sharma**, a student of your college for **MD Paediatrics** along with the names of Supervisor/Co-Supervisor as under:-

Topic Plan of Thesis
Clinical profile and outcome of febrile neutropenia in pediatric oncology patients .

Supervisor
Dr. Deepak Bhat
Prof.,
Dept. of Paediatrics,
DMCH, Ludhiana.

Co-Supervisor
Dr. Shruti Kalekar
Asst. Prof.,
Dept. of Paediatrics,
DMCH, Ludhiana.

The student has to submit the four copies of thesis (along with PDF format) , to the Controller of Examinations, BFUHS, Faridkot, at least six months before the commencement of theory examination, if he/she is otherwise eligible to take the examination. He /She must directed to attach a photocopy of this letter with the forwarding letter while submitting thesis to the University along with the letter of approval of University for change of supervisor/Co-Supervisor, change of topic.(if any).

SPSingh

Dr. S P Singh MS(Oph)
Controller of Examinations

Note :

85. If any discrepancy found regarding topic of thesis or Supervisor/Co-Supervisor, inform undersigned within one month after issue of this letter.

86. The student may submit the thesis as per the schedule already conveyed i.e for May/June examination 30th Nov of the preceding the year of examination and for Nov/Dec examinations 31st May of the year of examination.

CLINICAL PROFILE AND OUTCOME OF FEBRILE NEUTROPENIA IN PAEDIATRIC ONCOLOGY PATIENTS

THESIS PROPOSAL

FOR APPROVAL OF SUBJECT OF THESIS TO BE SUBMITTED IN

PARTIAL FULFILMENT OF THE REQUIREMENTS

FOR THE DEGREE OF

MD

In

PEDIATRICS

OF THE

BABA FARID UNIVERSITY OF HEALTH SCIENCES

FARIDKOT

March, 2021

DR. MITALI SHARMA

DEPARTMENT OF PEDIATRICS
DAYANAND MEDICAL COLLEGE AND HOSPITAL
LUDHIANA

ABSTRACT OF PLAN OF THESIS

Title	Clinical profile and outcome of febrile neutropenia in Pediatric oncology patients
For the degree of	MD (Pediatrics)
Name of the candidate	Dr. Mitali Sharma
Supervisor	Dr Deepak Bhat, Professor, Department of Pediatrics, DMCH, Ludhiana
Co-supervisors	Dr. Shruti Kakkar, Assistant Professor, Department of Pediatrics DMCH, Ludhiana
Institution	Dayanand Medical College & Hospital, Ludhiana
University	Baba Farid University of Health Sciences, Faridkot

INTRODUCTION: Febrile neutropenia is development of fever in a patient with low neutrophil count which can rapidly progress to sepsis, septic shock and haemodynamic instability. It remains an important cause of morbidity and mortality in children suffering from malignancy.

AIM OF STUDY: 1. To study the clinical profile of children presenting with febrile neutropenia. 2. To study the time to antibiotic administration in children with febrile neutropenia

MATERIALS & METHODS: This is a prospective observational study which will be conducted in the department of Pediatrics, Dayanand Medical College and Hospital, Ludhiana. All the children with an underlying malignancy who develop febrile neutropenia and require hospitalisation will be taken in the study after taking due consent.

CLINICAL SIGNIFICANCE: After this study, we will be able to formulate various risk factors for developing febrile neutropenia and their effect on outcome.

Time to antibiotics influences the outcome in terms of requirement of resuscitation, intensive care and death. Therefore, it is critical to administer antibiotics as soon as patient presents with fever in neutropenia. By assessing the time to antibiotics, we will be able to intervene appropriately by targeting appropriate reasons for the delay.

KEYWORDS: Febrile Neutropenia, Absolute neutrophil count (ANC), golden hour, time to antibiotics.

(Signature) Candidate	(Signature) Co-supervisor	(Signature) Supervisor	(Signature) Principal

CERTIFICATE OF FACILITIES AVAILABLE

This is to certify that the facilities for work on the subject of thesis titled **"CLINICAL PROFILE AND OUTCOME OF FEBRILE NEUTROPENIA IN PEDIATRIC ONCOLOGY PATIENTS"** exist in the Department of Pediatrics, DMC&H, Ludhiana and will be provided to the candidate. We will see that the data being included in the thesis is genuine and is collected by the candidate herself under our supervision and guidance.

Supervisor

Dr. Deepak Bhat
Professor
Department of Pediatrics
DMCH, Ludhiana

Co-Supervisor

Dr. Shruti Kakkar
Assistant Professor
Department of Pediatrics
DMCH, Ludhiana

Head of the Department

Dr. Puneet A Pooni
Professor & Head
Department of Pediatrics
DMCH, Ludhiana

Place : LUDHIANA

Date : 12/03/2021

APPROVAL PROFORMA
BY
RESEARCH & ETHICAL COMMITTEE
DAYANAND MEDICAL COLLEGE & HOSPITAL, LUDHIANA

Name of candidate	Dr. Mitali Sharma
Department	Pediatrics
Topic of Thesis	CLINICAL PROFILE AND OUTCOME OF FEBRILE NEUTROPENIA IN PEDIATRIC ONCOLOGY PATIENTS
Likely date of appearing in PG examination	May, 2023
Date of enrollment	26th July, 2020
Name of Head of Department	Dr. Puneet A. Pooni
1) Supervisor **2) Co-Supervisor(s)**	Dr. Deepak Bhat Dr. Shruti Kakkar
Signature of Members of Research Committee with Stamp	**Signature of Members of Ethics Committee with Stamp**
Dr. Harpreet Kaur (Professor & Head, Pathology)	Mr. R K Sharma (Legal Expert)
Dr. Jaspal Singh (Professor & Head, Surgery)	Dr. Ramit Mahajan (Associate Professor, Gastroenterology)
Dr. Dinesh Gupta (Professor & Head, Medicine)	Dr. Anu Sharma (Professor, Anatomy)
Dr. Sandeep Kaushal (Dean Academics & Professor & Head, Pharmacology)	Dr. Sandeep Kaushal (Dean Academics & Professor & Head, Pharmacology)
Dr. Gurpreet S Wander (Vice Principal)	Dr. Gurpreet S Wander (Vice Principal & Professor & Head, Cardiology)
	Dr. Gagandeep Singh (Secretary, Ethics Committee Professor & Head, Neurology)

Approved: Yes / No

Dr. Sandeep Puri
Chairperson
Research Committee

Approved: Yes / ~~No~~

Prof. Arvind Malhotra
Chairperson
Ethics Committee

BABA FARID UNIVERSITY OF HEALTH SCIENCES, FARIDKOT

PROFORMA FOR REGISTRATION OF SUBJECT FOR DISSERTATION

1	NAME OF THE CANDIDATE AND ADDRESS	Mitali Sharma H.Nno.6/654, Onkar Nagar, Cinema vali gali, near V-mart, Gurdaspur, 143521, Punjab.
2	NAME OF THE INSTITUTE	Dayanand Medical College and Hospital, Ludhiana
3	COURSE OF STUDY AND SUBJECT	MD Pediatrics
4	DATE OF ADMISSION OF COURSE	26th July 2020
5	TITLE OF THE TOPIC	Clinical profile and outcome of febrile neutropenia in pediatric oncology patients

6. BRIEF RESUME OF THE INTENDED WORK

6.1 NEED FOR THE STUDY

The purpose of our study is to evaluate the incidence, demographic characteristics and clinical profile of children with febrile neutropenia. As febrile neutropenia is a leading cause of morbidity and mortality in children with malignancies, this study would help us determine the parameters associated with worse outcome in these children and would be useful in identifying patients that need more intensive treatment.

As the episodes of febrile neutropenia may prolong the hospital stay, increase health care expenses and compromise the efficacy of chemotherapy due to delays and dose reduction, therefore it is important to predict the risk factors at an early stage. An early prediction of risk factors may modify the outcome in several patients and help to improve the survival rates.

As we make progress in reducing infection associated deaths in children in India, it is not acceptable to ignore children with malignancies, who have an increasing likelihood of cure with appropriate treatment. Identifying the preventable causes that may lead to morbidity and mortality in patients with malignancies is as important as in other infection associated diseases. Our study would evaluate the clinical profile of oncology patients with febrile neutropenia and would help in identifying such modifiable risk factors.

The 5 year survival rate of acute childhood leukemia is about 80% in western population, compared to 37-40% in India.[1-2] Reasons for poor outcome in our country are multifold - inaccessible diagnosis and treatment, limited hospital beds and manpower, late stage presentation, infection related deaths, abandonment of treatment due to higher costs resulting from prolonged hospital stays and intravenous antibiotics being few of them.[3-5] Febrile neutropenia is one such modifiable cause of poor outcome, which continues to be an important cause of mortality and morbidity. A thorough evaluation of clinical profile

of these patients would help to develop strategies or policies to reduce mortality in vulnerable patients.

Patients with febrile neutropenia need to be administered with broad spectrum antimicrobials within 60 minutes of time from presentation in the hospital. This time is referred to as the golden hour.[6] The reasons for delay could be patient related such as late arrival to the hospital due to non-availability of transport, ingestion of paracetamol or other NSAIDs at home, inability to realise seriousness of situation, ignorance or unawareness of parents, waiting for another fever spike, poor iv access, monetary issues, or could be hospital related.[7]

It has been proven that prompt and systematic management of febrile neutropenia significantly decreases mortality in these children.[8-9] It has also been observed that length of hospital stay corelates positively with door to antibiotic interval.[10]

In cases with severe sepsis, each hour of delay in antibiotic administration over the ensuing 6 hours of onset of hypotension has been found to be associated with an average decrease in survival of 7.6%.[11] These survival rates can easily be improved by prompt and timely administration of empirical antibiotics.

The need of this study is to assess the clinical profile of children with febrile neutropenia, factors contributing to poor prognosis, and to identify the time to antibiotics and its outcome.[12-14]

6.2 REVIEW OF LITERATURE

Out of all cancers in India , 1.6 to 4.8% are seen in children below 15 years of age.[15] The incidence of childhood cancer in most populations in the world ranges from 75 to 150 per million children per year and in India, incidence ranges from 38 to 124 per million children per year and the reported incidence of childhood cancer in India in males is higher than in females.[2,14,16] Leukemia is the most common childhood cancer in India with proportion varying between 25 and 40% and 60-85% of all leukemias reported are acute lymphoblastic leukemia (ALL).[15] The incidence of febrile neutropenia varies between 10 and 50% in solid tumours and is reportedly ≥80% in haematological malignancies. Febrile neutropenia accounts for approximately 40-50% of total cost of hospitalization in cancer care and results in mortality rates between 3% and 20%, depending on risk factors.

Febrile neutropenia: Febrile neutropenia is defined as single oral temperature of ≥101°F or a temperature ≥ 100.4°F sustained over a one hour period with neutropenia i.e ANC < 500/mm³ or a predicted decrease to <500/mm³ over the next 48 hours.[17]

Bacteremia: Bacteremia is defined as at least one positive blood culture, irrespective of the pathogen detected, using a qualitative automated culture system.[18]

CLABSI (Central line associated blood stream infection): CLABSI is defined as a laboratory confirmed bloodstream infection not related to an infection at another site that develops within 48 hours of central line placement.

Neutropenic enterocolitis: NEC is an acute life threatening condition characterized by transmural inflammation of the caecum, often with involvement of ascending colon and ileum, in patients who are severely immunosuppressed.[19] The affected gut becomes thick walled, with mucosal ulceration, fibrin exudates, and partial to full thickness haemorrhagic necrosis.

Sepsis: Sepsis is defined as serious organ dysfunction caused by a dysregulated host response to infection. Organ dysfunction is represented by an increase in SOFA score of 2 points or more.[20]

- GCS score <15
- SBP ≤ 100 mm Hg
- Respiratory rate ≥ 22/min

Septic Shock: Septic shock is defined as a subset of sepsis in which there is a requirement of a vasopressor to maintain a mean arterial pressure ≥ 65 mmHg and serum lactate level greater than 2 mmol/L in the absence of hypovolemia.[20]

Fungal infection: Fungal infection can be defined as possible, probable and proven on the basis of –

Host criteria	Clinical criteria	Mycological criteria
1. Recent history of neutropenia 2. Allogenic stem cell transplant 3. Prolonged use of corticosteroids 4. Inherited severe immunodeficiency 5. On immuno-suppressants	1. Lower respiratory tract fungal infection 2. Tracheo-bronchitis 3. Sino-nasal infection 4. CNS infection 5. Disseminated candidiasis	1. Direct tests- Cytology, Direct microscopy, or culture positive. 2. Indirect tests- detection of antigen (Galactomannan) or cell wall constituents.

Possible fungal infection- is said to be present in cases which meet criteria for host factor and clinical criteria.

Probable fungal infection- is said to be present in cases which meet criteria for host factor, clinical criteria and mycological criteria.

Proven fungal infection- is said to be present in cases which meet probable fungal infection criteria along with detection of fungus by histological analysis or a positive culture of a specimen of tissue taken from site of disease or detection of capsular antigen in CSF or a positive result of an India ink preparation of CSF.

RISK STRATIFICATION: Risk stratification is a recommended starting point for managing patients with fever and neutropenia.

High risk patients – those with anticipated prolonged (>7 days) and profound neutropenia (ANC≤100 cells/mm^3 following chemotherapy) and/or significant medical co-morbid conditions, including hypotension, pneumonia, new onset abdominal pain or neurologic changes- are candidates for intravenous empirical therapy.

Low risk patients – those with anticipated brief (≤7 days) and neutropenic periods and no or few co-morbidities- are candidates for oral empirical therapy.

Formal risk classification may be performed using the validated Multinational Association for Supportive Care in Cancer **(MASCC)** scoring system, which is available for adults. Various scoring systems are available for children, which are as under-

Predictive models for risk stratification in pediatric febrile neutropenia included in study[21]:

MODEL	OUTCOME PREDICTED	VARIABLES AND THEIR SCORING	RISK STRATIFICATION
1.Santolaya et al.	Invasive bacterial infection	1.Relapsed leukemia 2. Chemotherapy within 7 days of episode 3. CRP≥90 mg/L 4.Hypotension 5. Platelets ≤50,000/ mm^3	High risk- 2 risk factors or CRP≥90 mg/l or hypotension or relapse of leukemia Low risk- No risk factors or platelet ≤ 50,000/mm^3
2. Ammann et al.	Severe bacterial infection	1.Bone marrow involvement by malignancy=7 2.Diagnosis other than pre-B-ALL=3 3.No clinical signs of viral infection=4 4.CRP level 6-50 mg/L=3, CRP>50 mg/ml=6 5.TLC 0.6-1.0X10^9=3, TLC≤0.5 X 10^9=6 6 .Central venous	High risk:-Sum>4 Low risk:-Sum ≤ 4

		catheter present=2 7.Hb 7-10 mg/dl=2, ≤7 mg/dl=1	
3. Rondinelli et al.	Severe infectious complications	1.Central venous catheter present=2 2. Age >5 years=1 3. Clinical site of infection=4.5 4.No upper respiratory tract infection=2.5 5.Fever>38.5°C=1 6.Hb≤7 mg/dl=1	Low risk-2.5 to <5.5 Intermediate- ≥5.5 to 9.0 High risk- ≥9
4. SPOG adverse events rule	Adverse events	1.Chemotherapy more intensive than ALL maintenance = 4 2. Hb>9 mg/dl=5 3.TLC < 0.3 X 10^9 /l=3 4.Platelet<50,000=3	Low risk-<24 High risk-≥9
5. Hakim et al.	Proven bacterial infection or culture negative sepsis	1.Score from cancer diagnosis: AML=20, ALL/Lymphoma=7, Solid=0 2.Clinical presentation of serious unwell/toxic=14 3.Fever at presentation≥39°C=11 4.ANC <100/mm^3=10	Low risk-<24 High risk-≥24
6. Agyeman et al.	Bacteremia	1.Shaking chills ever observed 2.Hb>9 mg/dl 3.Platelet<50,000/mm^3 4. Any other need for inpatient care	Low risk-no risk factors High risk- any one
7.Anirban Das et al.	Complications	1.Undernutrition=2 2.Time from last chemotherapy ≤ 7 days = 2 3.Presence of focus of infection = 2 4.ANC ≤ 100/mm^3=2 5.CRP > 60 mg/ml= 5	Low risk-<7 High risk-≥7

Prasad M, Chinnaswamy G , Arora B, Vora T, Hawaldar R, Banavali S et al. studied on risk predictors for adverse outcome in pediatric febrile neutropenia Risk stratification of patients with febrile neutropenia into high risk and low risk of developing complications helps in making decision regarding optimal treatment i.e whether to treat with oral or intravenous antibiotic and whether to treat as inpatient or outpatient. 250 consecutive episodes of chemotherapy induced febrile neutropenia in 183 pediatric patients were analysed and adverse outcomes were defined. 29% of total patients had solid tumours and 71% had haematolymphoid tumours- 43% had ALL and 14.7% were of AML. 5 factors that were found to independently predict adverse outcome were-

- Previously documented infection in the last 6 months (P-0.011)
- Presence of significant focus of infection (P < 0.001)
- ANC < 100/mm^3 (P-0.016)
- Peak temperature > 102.2°F in this episode of febrile neutropenia (P-0.007)
- Fever persisting for more than 5 days during this episode of febrile neutropenia (P < 0.001)

Anirban Das, Amita Trehan, Sapna Oberoi, Deepak Bansal et al. study on validation of risk stratification for children with febrile neutropenia in pediatric oncology unit in India [21] . The study aimed to substantiate a score predicting risk of complications in pediatric patients with febrile neutropenia. Children with cancer and presenting with febrile neutropenia were evaluated in a prospective study. A score predicting the risk of complications, which was previously derived was substantiated on a prospective cohort. Complications were observed in 109 (26.3%) of 414 episodes of febrile neutropenia over 15 months. A risk based score based on undernutrition (2 points), time from last chemotherapy (<7 days- 2 points), presence of a non-upper respiratory focus of infection (2 points), CRP > 60 mg/l (5 points) and ANC < 100/mm^3 (2 points) was used to stratify patients into low risk (50.2%) and high risk (49.8%). The outcomes included microbiologically

detected infection in 19.8%, complications (respiratory failure, shock, encephalopathy, admission to ICU, metabolic complications, congestive cardiac failure, neutropenic enterocolitis, coagulopathy and bleeding) in 26.3% and mortality in 10.4%.

Thomas Lehrnbecher, Paula Robinson, Brain Fisher et al. guideline for management of fever and neutropenia in children with cancer and hematopoietic stem cell transplantation recepients.[23] The purpose was to update a clinical practice guideline for the empirical management of fever and neutropenia in children with cancer. For risk stratification and evaluation, systematic review of observational study were done. For questions of therapy, a systematic review of randomized trials of any intervention applied for management of febrile neutropenia was conducted. Recommendations related to clinical presentation, management, and empirical antifungal therapy of febrile neutropenia were reviewed and the most considerable changes were related to anti-fungal therapy, such as including 4th generation cephalosporin for empirical therapy in high-risk febrile neutropenia, risk stratification to define patients with high risk invasive fungal disease , modification in recommended radiological investigations and biomarkers for evaluation of fungal disease and a weak recommendation to withhold empirical antifungal therapy in low risk invasive fungal disease patients with prolonged febrile neutropenia.

Sapna Oberoi, Amita Trehan, R.K. Marwaha, Deepak Bansal et al. study on Symptom to door interval in febrile neutropenia[7] to determine the symptom to door interval in febrile neutropenic children with malignancies and to identify factors resulting in delay. All consecutive children of ALL presenting with febrile neutropenia over a period of one year were evaluated. All the required data for demographics, clinical details, phase of therapy, profile of care-givers, travelling time, reasons for delay, length of hospital stay and outcome was recorded. Among 320 febrile neutropenia episodes, median symptom to door interval (SDI) was 24 hours. SDI during induction phase (median-8 hours) was less as compared to maintenance phase (median-36 hours). Ingestion of acetaminophen at home (30%), inability to realise seriousness of

situation (27%), ignorance or unawareness of parents (9%) and non-availability of transportation services (12%) were the most common causes for delay and concluded that there was a considerable time lag seen between onset of symptoms and reaching hospital.

6.3 AIMS AND OBJECTIVES OF THE STUDY

- To study the clinical profile of children presenting with febrile neutropenia.
- To study the time to antibiotic administration in children with febrile neutropenia.

7. MATERIALS AND METHODS

This is a prospective observational study which will be conducted over a period of one year from 1st march 2021 to 28th Feb 2022 in Department of Pediatrics, Dayanand Medical College and Hospital, Ludhiana. All the patients who have an underlying malignancy and have developed febrile neutropenia as a result, will be taken as subjects after taking consent from each patient for the same.

This study will be conducted after taking approval from the Institutional Ethics committee.

RISK STRATIFICATION: Risk stratification is a recommended starting point for managing patients with fever and neutropenia.

High risk patients – those with anticipated prolonged (>7 days) and profound neutropenia (ANC≤100 cells/mm^3 following chemotherapy) and/or significant medical co-morbid conditions, including hypotension, pneumonia, new onset abdominal pain or neurologic changes- are candidates for intravenous empirical therapy.

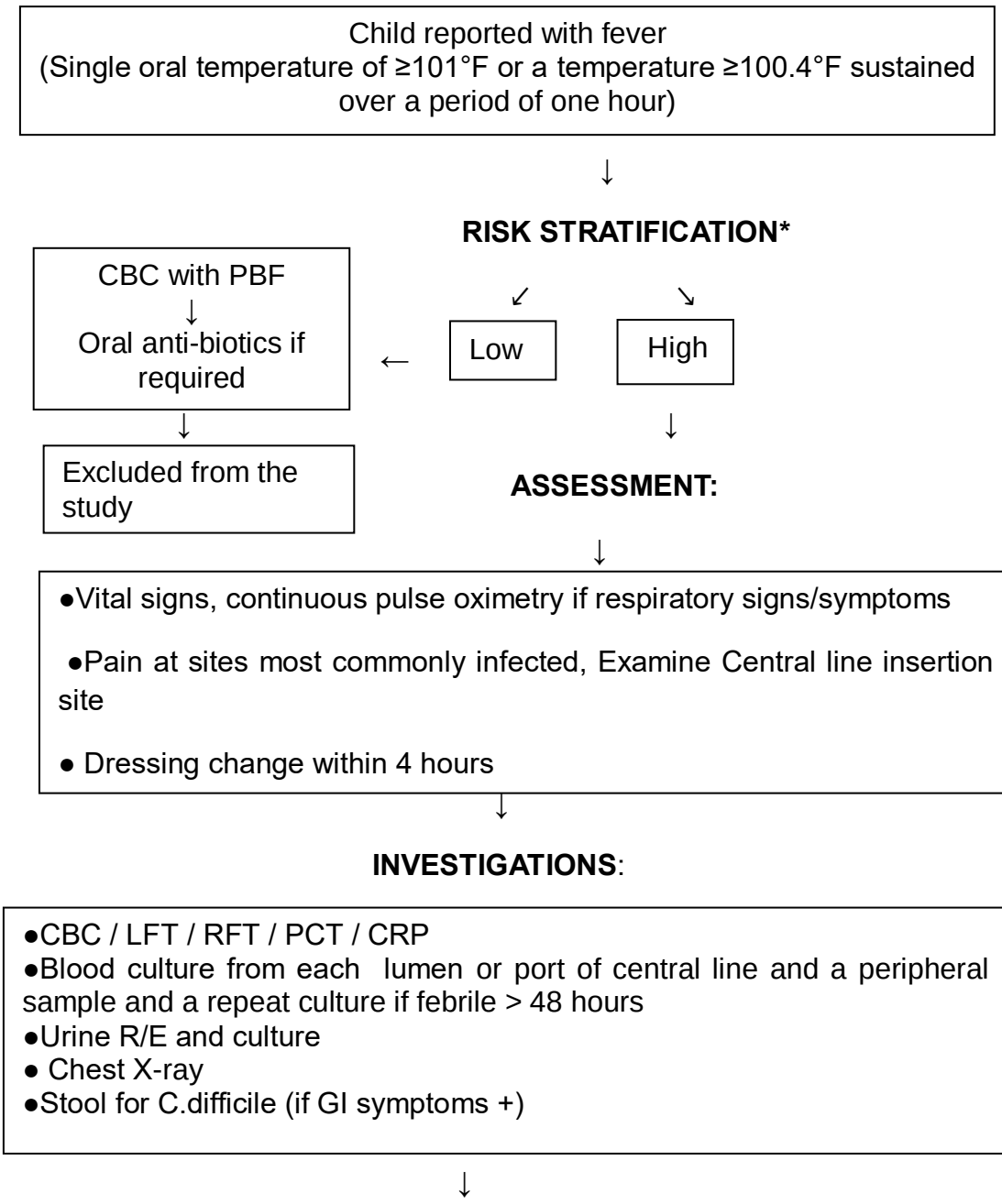
Low risk patients – those with anticipated brief (≤7 days) and neutropenic periods and no or few co-morbidities- are candidates for oral empirical therapy.

Anirban Das et al.(PGIMER) RISK MODEL*:

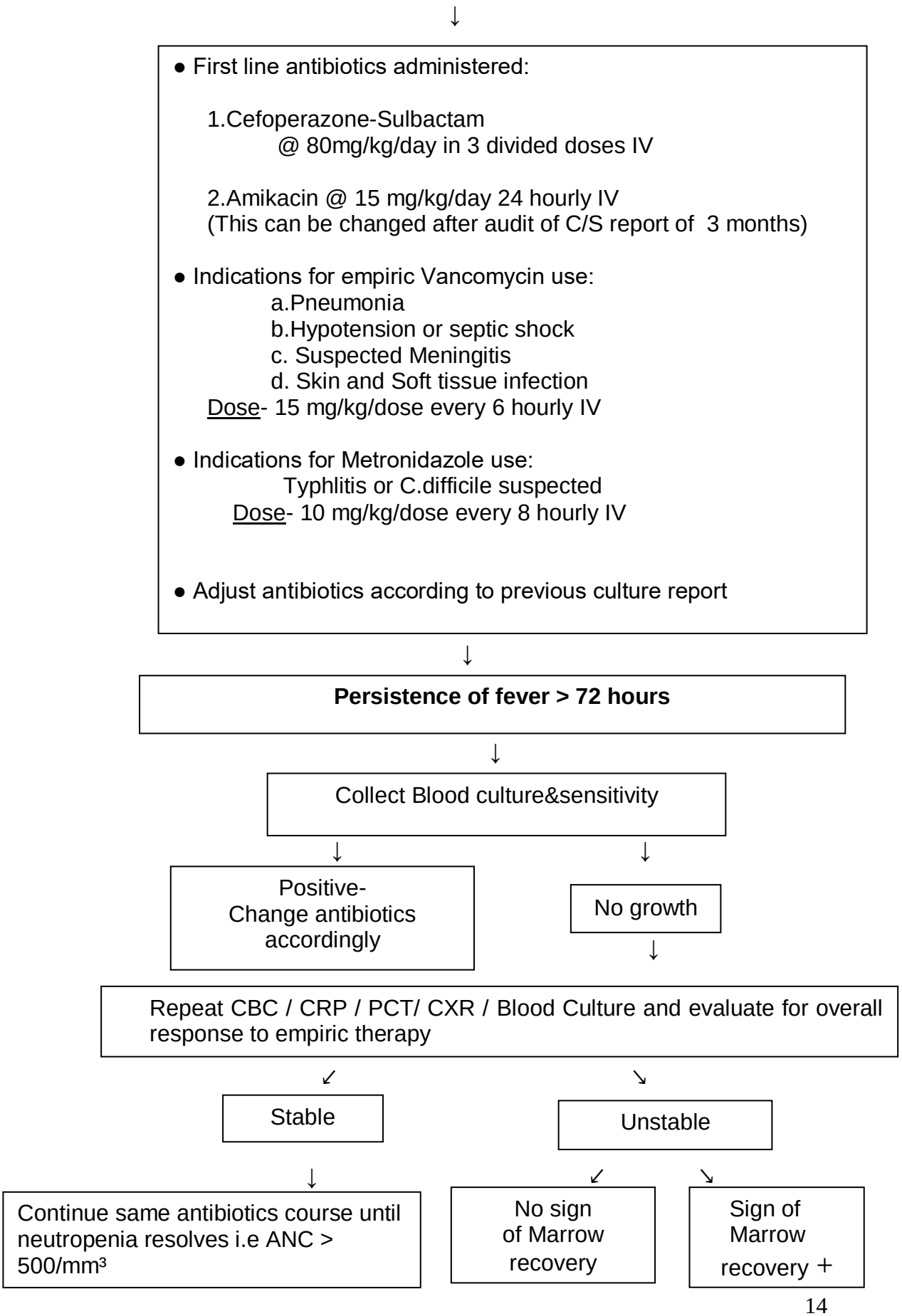
1. Undernutrition=2
2. Time from last chemotherapy ≤ 7 days = 2
3. Presence of focus of infection = 2
4. ANC ≤ 100/mm^3=2
5. CRP > 60 mg/ml = 5

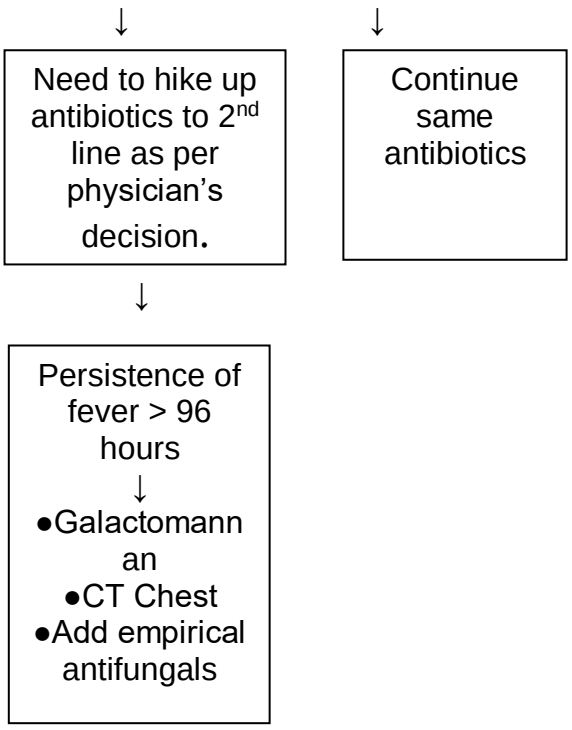
[Risk Stratification-Low risk-<7, High risk- ≥7]

MANAGEMENT ALGORITHM FOR FEBRILE NEUTROPENIA :


Child reported with fever
(Single oral temperature of ≥101°F or a temperature ≥100.4°F sustained over a period of one hour)
RISK STRATIFICATION*
Low
High
CBC with PBF
Oral anti-biotics if required
Excluded from the study
ASSESSMENT:
●Vital signs, continuous pulse oximetry if respiratory signs/symptoms
●Pain at sites most commonly infected, Examine Central line insertion site
● Dressing change within 4 hours
INVESTIGATIONS:
●CBC / LFT / RFT / PCT / CRP
●Blood culture from each lumen or port of central line and a peripheral sample and a repeat culture if febrile > 48 hours
●Urine R/E and culture
● Chest X-ray
●Stool for C.difficile (if GI symptoms +)

ANTIBIOTICS


● First line antibiotics administered:
1.Cefoperazone-Sulbactam
@ 80mg/kg/day in 3 divided doses IV
2.Amikacin @ 15 mg/kg/day 24 hourly IV
(This can be changed after audit of C/S report of 3 months)
● Indications for empiric Vancomycin use:
a.Pneumonia
b.Hypotension or septic shock
c. Suspected Meningitis
d. Skin and Soft tissue infection
Dose- 15 mg/kg/dose every 6 hourly IV
● Indications for Metronidazole use:
Typhlitis or C.difficile suspected
Dose- 10 mg/kg/dose every 8 hourly IV
● Adjust antibiotics according to previous culture report
Persistence of fever > 72 hours
Collect Blood culture&sensitivity
Positive-
Change antibiotics
accordingly
No growth
Repeat CBC / CRP / PCT/ CXR / Blood Culture and evaluate for overall response to empiric therapy
Stable
Unstable
Continue same antibiotics course until neutropenia resolves i.e ANC > 500/mm³
No sign
of Marrow
recovery
Sign of
Marrow
recovery +


Need to hike up antibiotics to 2nd line as per physician's decision.
Continue same antibiotics
Persistence of fever > 96 hours
●Galactomannan
●CT Chest
●Add empirical antifungals

●CBC would be repeated every alternate day to look for signs of marrow recovery.

● Requirement of G-CSF would be decided on a case to case basis.

7.1 Source of Data

Patients between 1 month-18 years, diagnosed with malignancy and admitted in Pediatric Haemato-oncology ward in Department of Pediatrics, Ludhiana.

7.2 METHOD OF COLLECTION OF DATA

Data would be collected from consenting patients meeting inclusion criteria after briefing them about the purpose of study.

The proforma consists of demographic details of the participants and information related to primary diagnosis and ongoing treatment. A structured proforma based on objectives of study will be designed to assess the time to first antibiotics

Patients with suspected febrile neutropenia will be managed according to a pre-designed algorithm (attached). The study investigator would be monitoring each patient. A record register will be maintained by the staff, mentioning the temperature of child at arrival, time of arrival and

time of administration of first antibiotics and would be counter checked by the resident on duty. Time of arrival to Pediatric Haemato-oncology unit will be taken as the zero hour and the time of first onset of fever would be depicted in ”–ve” hours

INCLUSION CRITERIA:

1.Patients between 1 month-18 years of age, diagnosed with malignancy.

2.Single oral temperature of ≥101°F or a temperature ≥100.4°F sustained over one hour period with neutropenia i.e ANC < 500/mm³ or a predicted decrease to <500/mm³ over the next 48 hours.

EXCLUSION CRITERIA:

1. Patients > 18 years of age
2. Refusal to give consent
3. Neutropenia in patients other than malignancies.

4.Low risk febrile neutropenia being managed on oral antibiotics.

OUTCOME

To study the effect of ‘time to antibiotic administration” in children with febrile neutropenia on clinical outcome.

STATISTICAL ANALYSIS

Data will be described in terms of range; mean ± standard deviation (±SD), median, frequencies (number of cases) and relative frequencies (percentages) as appropriate. All statistical calculations will be done using (Stastical Package for the Social Science) SPSS 21 version (SPSS Inc., Chicago, IL, USA) statistical program for Microsoft Windows

7.3 DOES THE STUDY REQUIRE ANY INVESTIGATIONS OR INTERVENTIONS TO BE CONDUCTED ON PATIENTS OR OTHER HUMANS OR ANIMALS? IF SO, PLEASE DESCRIBE BRIEFLY.

Investigations to be conducted on patients-

- Blood- CBC, LFT, RFT, PCT, CRP, Galactomannan, Blood culture & sensitivity
- Urine-Urine Routine examination and Culture & sensitivity

- Radiology- Chest X-ray

7.4 HAS ETHICAL CLEARANCE BEEN OBTAINED FROM YOUR INSTITUTION IN CASE OF 7.3?

Attached herewith

LIST OF REFERENCES

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BASE LINE DATA

NAME - _____

DATE OF ADMISSION - _____

TIME OF ADMISSION - _____

PHO FILE NO - _____

MRD NO - _____

1. Age

[ ] years [ ] months

2. Gender

2.1)Male ☐ 2.2)Female ☐

3. Nutritional Status:

3.1)weight - [ ] 3.2)height- [ ]

3.1.1)< 3rd centile ☐	3.2.1)< 3rd centile ☐
3.1.2) 3rd - 10th centile ☐	3.2.2) 3rd - 10th centile ☐
3.1.3) 10th - 50th centile ☐	3.2.3) 10th - 50th centile ☐
3.1.4) 50th - 90th centile ☐	3.2.4) 50th - 90th centile ☐
3.1.5) > 90th centile ☐	3.2.5) > 90th centile ☐

3.3)Body mass index [ ] 3.4)Mid upper arm circumference [ ]

4. Diagnosis (type of malignancy) [ ]

5. Stage/Risk

5.1)Standard ☐ 5.2)Intermediate ☐ 5.3)High ☐

6. Phase of Chemotherapy

6.1) Intensive phase [ ]

6.2) Maintenance phase [ ]

7. Day Since Last:

7.1) CHEMOTHERAPY [ ]

7.2) RADIOTHERAPY (+/-) [ ]

7.3) SURGERY (+/-) [ ]

8. Presentaion :

8.1)As Inpatient ☐

8.2)As Outpatient ☐

8.3)time since last discharge

8.3.1) <72 hours ☐ 8.3.2) >72 hours ☐

9. PICC line

9.1)YES ☐

9.2)NO ☐

RESIDENT SIGNATURE _____ SUPERVISOR SIGNATURE _____

CLINICAL FEATURES

10. Mucositis

10.1)YES ☐
10.2)NO ☐

10.1.1)GRADE 1 ☐ 10.1.2)GRADE 2 ☐ 10.1.3)GRADE 3 ☐ 10.1.4)GRADE 4 ☐

11. Peri-Anal Involvement

11.1)YES ☐
11.2)NO ☐

11.1.1)At presentation ☐ 11.1.2)During hospital stay ☐

12. GIT symptoms

12.1)YES ☐

12.1.1)Pain abdomen ☐ 12.1.1.1)At presentation ☐ 12.1.1.2)During hospital stay ☐
12.1.2)Diarrhoea ☐
A) bloody
12.1.2.A.1)At presentation ☐ 12.1.2.A.2)During hospital stay ☐
B) Non bloody
12.1.2.B.1)At presentation ☐ 12.1.2.B.2)During hospital stay ☐

12.2)NO ☐

13. Respiratory symptoms

13.1)YES ☐

13.1.1)Cough ☐ 13.1.1.1)At presentation ☐ 13.1.1.2)During hospital stay ☐
13.1.2)Distress ☐ 13.1.2.1)At presentation ☐ 13.1.2.2)During hospital stay ☐

13.2)NO ☐

14. Urinary complaints

14.1)YES ☐

14.1.1)UTI ☐ 14.1.1.1)At presentation ☐ 14.1.1.2)During hospital stay ☐
14.1.2)Oliguria/anuria ☐ 14.1.2.1)At presentation ☐ 14.1.2.2)During hospital stay ☐

14.2)NO ☐

15. CVS symptoms

15.1)YES ☐

15.1.1)Palpitations ☐ 15.1.1.1)At presentation ☐ 15.1.1.2)During hospital stay ☐
15.1.2)Breathlessness ☐ 15.1.2.1)At presentation ☐ 15.1.2.2)During hospital stay ☐

15.2)NO ☐

16. CNS symptoms

16.1)YES ☐

16.1.1)Seizures ☐ 16.1.1.1)At presentation ☐ 16.1.1.2)During hospital stay ☐
16.1.2)Altered Sensorium ☐ 16.1.2.1)At presentation ☐ 16.1.2.2)During hospital stay ☐

16.2)NO ☐

17. Musculo-skeletal symptoms

17.1)YES ☐

17.1.1)Myalgias ☐ 17.1.1.1)At presentation ☐ 17.1.1.2)During hospital stay ☐
17.1.2)Bony pains ☐ 17.1.2.1)At presentation ☐ 17.1.2.2)During hospital stay ☐

17.2)NO ☐

18. Others

RESIDENT SIGNATURE _____ SUPERVISOR SIGNATURE _____

VITALS

19.Tachycardia ☐

1 month to 1 year	- >120 bpm
1 to 5 years	- >110 bpm
5 to 10 years	- >100 bpm

19.1)YES ☐ 19.1.1)At presentation ☐ 19.1.2)During hospital stay ☐

19.2)NO ☐

20.Tachypnea ☐

1 month to 2 months	- >60/minute
2 months to 1 year	- >50/minute
>1 year	- >40/minute

20.1)YES ☐ 20.1.1)At presentation ☐ 20.1.2)During hospital stay ☐

20.2)NO ☐

21.Hypotension ☐

1 month to 1 year	- < 60 / 50 mmHg
1 to 5 years	- < 85 / 55 mmHg
5 to 10 years	- < 95 / 60 mmHg

21.1)YES ☐ 21.1.1)At presentation ☐ 21.1.2)During hospital stay ☐

21.2)NO ☐

22.De-saturation (<90%) ☐

22.1)YES ☐ 22.1.1)At presentation ☐ 22.1.2)During hospital stay ☐

22.2)NO ☐

23.Prololged CFT (>2sec) ☐

23.1)YES ☐ 23.1.1)At presentation ☐ 23.1.2)During hospital stay ☐

23.2)NO ☐

RESIDENT SIGNATURE _____ **SUPERVISOR SIGNATURE** _____

INVESTIGATIONS

	day 1	day 3	day 5	day 7	day 9	day 11	day 13
24.TLC (10^3/uL)							
25.DLC (%)							
26.ANC (per mm^3)							
27.Grade of neutropenia							
27.1)GRADE 1 (>1500)							
27.2)GRADE 2 (1000-1500)							
27.3)GRADE 3 (500-1000)							
27.4)GRADE 4 (<500)							

28.Duration of neutropenia(<500/mm^3) _____ days

29.Platelets (10^3/uL)							
30.MPV (fL)							
31.Hb (gm/dl)							
32.RBC count (10^6/uL)							
33.PCV (%)							
34.MCV (fL)							
35.MCH (Pg)							
36.MCHC (gm/dl)							
37.RDW (%)							
38.PCT (ng/ml)							
39.CRP (mg/lt)							

RESIDENT SIGNATURE _____ SUPERVISOR SIGNATURE _____

INVESTIGATIONS

	day 1	day 3	day 5	day 7	day 9	day 11	day 13
40.RFT							
40.1) Urea (mg/dl)							
40.2) Creatinine (mg/dl)							
40.3) Na/K/CL (mmol/lt)							
41.LFT							
41.1) T.BIL/D.BIL (mg/dl)							
41.2) SGOT/SGPT (U/L)							
41.3) ALP (U/L)							
41.4) T.Proteins (g/dl)							
41.5) S.Albumin (g/dl)							
42.Blood Culture							
43.Urine routine							
44.Urine culture							
45.Chest X-ray							
46.Galactomannan							
47.Clostridium difficile							
48.Others							

RESIDENT SIGNATURE _____ **SUPERVISOR SIGNATURE** _____

HOSPITAL COURSE

49. Date & time of onset of fever

50. Date & time of arrival to hospital

51. Duration b/w onset of Fever & Arrival to Hospital

52. Time of administration of antibiotics

53. Duration b/w Arrival & Anitibotics Administration

54. Delay

54.1)YES ☐

54.1.1) Duration

54.1.1.1) before arrival to hospital

54.1.1.2 after arrival to hospital

54.1.2) Cause

54.1.2.1) non availability of transport ☐

54.1.2.2) Ingestion of NSAID at home ☐

54.1.2.3) Unawareness of situation ☐

54.1.2.4) Hospital related ☐

54.2)NO ☐

55. Time to defervescence

56. Antibiotics given

57. Duration of antibiotics

58. Need to step up antibiotics

58.1)YES ☐

58.1.1)2nd line

58.1.2)3th line

58.2)NO ☐

59. Fungal infection

59.1)YES ☐ 59.1.1)Possible ☐ 59.1.2)Probable ☐ 59.1.3)Proven

59.2)NO ☐

60. Need of Anti-Fungals

60.1)YES ☐

60.2)NO ☐

61. Need of Anti-virals

61.1)YES ☐

61.2)NO ☐

RESIDENT SIGNATURE _____

SUPERVISOR SIGNATURE _____

HOSPITAL COURSE

62.Requirement of Oxygen

62.1)YES ☐

62.2)NO ☐

63.Requirement of Ventilation

63.1)YES ☐

63.1.1)non-invasive

63.1.2)invasive

63.2)NO ☐

64.Requirement of Inotropes

64.1)YES ☐

64.1.1)Inotrope given

64.1.2) No.of days

64.2)NO ☐

65.Requirement of PICU

65.1)YES ☐

65.1.1)Duration of stay days

65.2)NO ☐

66.Requirement of blood products

66.1)YES ☐

66.1.1)Packed cell (PC)

66.1.2)RDF

66.2)NO ☐

OUT COME

67. Recovery

67.1) with in 1 week: ☐

67.2) > 1 week: ☐

68.DAMA ☐

69.Mortality ☐

70.Shifted to PICU

70.1)YES ☐

70.2)NO ☐

71.Duration of hospital stay: DAYS

FINAL DIAGNOSIS:

RESIDENT SIGNATURE _____

SUPERVISOR SIGNATURE _____

INFORMED PATIENT CONSENT

Date: _____

I.....D/o, W/o, S/o.....
am willing to participate in the study **"CLINICAL PROFILE AND OUTCOME OF FEBRILE NEUTROPENIA IN PAEDIATRIC ONCOLOGY PATIENTS"** The procedure with its complications has been explained to me in local vernacular language. I have fully understood that no special tests and extra expenditure in any form, merely for the purpose of thesis is being carried out. I am free to opt out the study any time without assigning any reason.

.....
Signature of the Witness

Name:

.....
Signature of the patient

Signature of Candidate

Signature of Supervisor

मरीज अनुमति फार्म

तिथि _____

मैं _____ पत्नी/पुत्र/पुत्री _____ निवासी _____ इस शोधकार्य **"CLINICAL PROFILE AND OUTCOME OF FEBRILE NEUTROPENIA IN PAEDIATRIC ONCOLOGY PATIENTS"** में भाग लेने के लिए सहमत हूँ। मैं इस शोधकार्य में भाग लेने के लिए अपनी स्वेच्छा से तैयार हूँ। मैं पुष्टि करता/करती हूँ की यह स्वीकृति देने के लिए मुझे कोई आर्थिक प्रलोभन नहीं दिया गया और न ही दबाव डाला गया है। मुझे इस शोधकार्य का उद्देश्य स्पष्ट कर दिया गया है और मुझे यह विश्वास है की यह विज्ञान और मानवता के लाभ के लिए है। मुझे इस शोधकार्य में होने वाले जोखिम के बारे में समझा दिया गया है और मेरी समझ में यह जोखिम बहुत मामुली है।

मैं इस शोधकार्य में भाग लेने के सम्बन्ध में किसी भी समय अपनी अस्वीकृति व्यक्त कर सकता/सकती हूँ और मेरे अस्वीकृति व्यक्त करने का मेरे इलाज पर कोई प्रभाव नहीं पड़ेगा।

_____ _____

गवाह के हस्ताक्षर रोगी के हस्ताक्षर/अंगूठे का निशान

नाम: नाम:

_____

अन्वेषक के हस्ताक्षर

_____

विद्यार्थी के हस्ताक्षर

ਮਰੀਜ਼ ਰਜ਼ਾਮੰਦੀ ਫਾਰਮ

ਮਿਤੀ_____

ਮੈ_____ਪਤਨੀ/ਪੁੱਤਰ/ਪੁੱਤਰੀ_____

_____

ਵਾਸੀ

_____

"CLINICAL PROFILE AND OUTCOME OF FEBRILE NEUTROPENIA IN PAEDIATRIC ONCOLOGY PATIENTS" ਤੇ ਚਲ ਰਹੀ ਖੋਜ ਵਿਚ ਹਿੱਸਾ ਲੈਣ ਲਈ ਰਜ਼ਾਮੰਦ ਹਾਂ। ਇਸ ਖੋਜ ਕੰਮ ਵਿਚ ਹਿੱਸਾ ਲੈਣ ਲਈ ਮੈ ਆਪਣੀ ਮਰਜ਼ੀ ਨਾਲ ਤਿਆਰ ਹਾਂ। ਮੈ ਇਹ ਦਸਣਾ ਚਾਹੁੰਦਾ ਹਾਂ/ ਚਾਹੁੰਦੀ ਹਾਂ ਕੇ ਇਹ ਰਜ਼ਾਮੰਦੀ ਦੇਣ ਵਾਸਤੇ ਮੈਨੂ ਕਿਸੇ ਵੀ ਤਰਾਂ ਦਾ ਲੋਭ-ਲਾਲਚ ਨਹੀ ਦਿੱਤਾ ਗਿਆ ਅਤੇ ਨਾ ਹੀ ਕੋਈ ਦਬਾ ਪਾਇਆ ਗਿਆ ਹੈ। ਮੈਨੂ ਇਸ ਖੋਜ ਦਾ ਮਨੋਰਥ ਸਮਝਾ ਦਿੱਤਾ ਗਿਆ ਹੈ ਅਤੇ ਮੈਨੂ ਇਹ ਭਰੋਸਾ ਦਵਾਇਆ ਗਿਆ ਹੈ ਕੇ ਇਹ ਖੋਜ ਵਿਗਿਆਨ ਅਤੇ ਮਾਨਵਤਾ ਦੀ ਭਲਾਈ ਲਈ ਹੈ। ਮੈਨੂ ਇਸ ਖੋਜ ਵਿਚ ਹੋਣ ਵਾਲੇ ਖਤਰੇ ਬਾਰੇ ਸਮਝਾ ਦਿੱਤਾ ਗਿਆ ਹੈ ਅਤੇ ਮੈਨੂ ਇਹ ਯਕੀਨ ਹੈ ਕੇ ਇਹ ਖਤਰਾ ਬਹੁਤ ਮਾਮੂਲੀ ਹੈ। ਮੈਨੂ ਇਸ ਖੋਜ ਕੰਮ ਵਿਚ ਹਿੱਸਾ ਲੈਣ ਦਾ ਢੰਗ – ਤਰੀਕਾ ਸਮਝਾ ਦਿੱਤਾ ਗਿਆ ਹੈ।

ਮੈ ਇਸ ਖੋਜ ਕੰਮ ਵਿਚ ਹਿੱਸਾ ਲੈਣ ਬਾਰੇ ਆਪਣੀ ਰਜ਼ਾਮੰਦੀ ਕਿਸੇ ਵੀ ਸਮੇ ਵਾਪਸ ਲੈ ਸਕਦਾ ਹਾਂ/ ਸਕਦੀ ਹਾਂ ਅੰਤੇ ਮੇਰੀ ਰਜ਼ਾਮੰਦੀ ਵਾਪਸ ਲੈਣ ਦਾ ਮੇਰੇ ਇਲਾਜ ਤੇ ਕੋਈ ਅਸਰ ਨਹੀ ਹੋਵੇਗਾ।

_____ _____

ਗਵਾਹ ਦੇ ਹਸਤਾਖਰ ਮਰੀਜ਼ ਦੇ ਹਸਤਾਖਰ

ਮਿਤੀ_____ ਮਿਤੀ_____

ਪਤਾ _____ ਪਤਾ _____

_____

ਨਿਰੀਖਕ ਦੇ ਹਸਤਾਖਰ

_____

ਸਿਖਿਆਰਥੀ ਦੇ ਹਸਤਾਖਰ

PATIENT'S PARENT/GUARDIAN CONSENT FORM

Date: ____/____/____

I .....F/o, M/o .....

R/o .....

am willing to let my child participate in the study entitled Bed **"CLINICAL PROFILE AND OUTCOME OF FEBRILE NEUTROPENIA IN PAEDIATRIC ONCOLOGY PATIENTS"**. The procedure with its complications has been explained to me in local vernacular language. I have fully understood that no special tests and extra expenditure in any form, merely for the purpose of thesis is being carried out. I am free to opt out the study any time without assigning any reason. This will not affect my treatment and investigation of my child.

Signature of the Witness
Name:

Signature/Thumb Impression of guardian
Name:

Signature of the Supervisor

Signature of Candidate

ਮਰੀਜ ਦੇ ਮਾਤਾ/ਪਿਤਾ ਦਾ ਰਜ਼ਾਮੰਦੀ ਫਾਰਮ

ਮਿਤੀ __/__/____

ਮੈਂ _____ ਪਿਤਾ/ਮਾਤਾ _____,
ਵਾਸੀ _____

ਆਪਣੇ ਬੱਚੇ ਦੇ ਇਸ ਅਧਿਐਨ ਵਿੱਚ ਹਿੱਸਾ ਲੈਣ ਤੇ ਰਜ਼ਾਮੰਦ ਹਾਂ। ਇਸ ਖੋਜ ਕੰਮ ਵਿੱਚ ਹਿੱਸਾ ਲੈਣ ਲਈ ਮੈਂ ਆਪਣੀ ਮਰਜ਼ੀ ਨਾਲ ਤਿਆਰ ਹਾਂ। ਮੈਂ ਇਹ ਦਸਣਾ ਚਾਹੁੰਦਾ/ਚਾਹੁੰਦੀ ਹਾਂ ਕਿ ਇਹ ਰਜ਼ਾਮੰਦੀ ਦੇਣ ਵਾਸਤੇ ਮੈਨੂੰ ਕਿਸੇ ਵੀ ਤਰ੍ਹਾਂ ਦਾ ਲੋਭ-ਲਾਲਚ ਨਹੀਂ ਦਿੱਤਾ ਗਿਆ ਅਤੇ ਨਾ ਹੀ ਕੋਈ ਦਬਾ ਪਾਇਆ ਗਿਆ ਹੈ। ਮੈਨੂੰ ਇਸ ਖੋਜ ਦਾ ਮਨੋਰਥ ਸਮਝਾ ਦਿੱਤਾ ਗਿਆ ਹੈ ਅਤੇ ਮੈਨੂੰ ਇਹ ਭਰੋਸਾ ਦਵਾਇਆ ਗਿਆ ਹੈ ਇਹ ਖੋਜ ਵਿਗਿਆਨ ਅਤੇ ਮਾਨਵਤਾ ਦੀ ਭਲਾਈ ਲਈ ਹੈ। ਮੈਨੂੰ ਇਸ ਖੋਜ ਵਿੱਚ ਹੋਣ ਵਾਲੇ ਖਤਰੇ ਬਾਰੇ ਸਮਝਾ ਦਿੱਤਾ ਗਿਆਂ ਹੈ ਅਤੇ ਮੈਨੂੰ ਇਹ ਯਕੀਨ ਹੈ ਕਿ ਇਹ ਖਤਰਾ ਬਹੁਤਾ ਮਾਮੂਲੀ ਹੈ। ਮੈਨੂੰ ਇਸ ਖੋਜ ਕੰਮ ਵਿੱਚ ਹਿੱਸਾ ਲੈਣ ਦਾ ਢੰਡ-ਤਰੀਕਾ ਸਮਝਾ ਦਿੱਤਾ ਗਿਆ ਹੈ।

ਮੈਂ ਇਸ ਖੋਜ ਕੰਮ ਵਿੱਚ ਹਿੱਸਾ ਲੈਣ ਬਾਰੇ ਆਪਣੀ ਰਜ਼ਾਮੰਦੀ ਕਿਸੇ ਵੀ ਸਮੇਂ ਵਾਪਸ ਲੈ ਸਕਦਾ/ਸਕਦੀ ਹਾਂ ਅਤੇ ਮੇਰੀ ਰਜ਼ਾਮੰਦੀ ਵਾਪਸ ਲੈਣ ਦਾ ਮੇਰੇ ਬੱਚੇ ਦੇ ਇਲਾਜ ਤੇ ਕੋਈ ਅਸਰ ਨਹੀਂ ਹੋਵੇਗਾ।

_____	_____
ਗਵਾਹ ਦੇ ਹਸਤਾਖਰ	ਮਰੀਜ਼ ਦੇ ਹਸਤਾਖਰ
ਮਿਤੀ _____	ਮਿਤੀ _____
ਪਤਾ _____	ਪਤਾ _____

_____	_____
ਨਰੀਖਕ ਦੇ ਹਸਤਾਖਰ	ਜਿਮੇਆਰਥੀ ਦੇ ਹਸਤਾਖਰ

मरीज के माता/पिता का अनुमति फार्म

तिथि __/__/___

मैं _____ पिता/माता/_____
वासी _____,
अपने बच्चे के इस शोधकार्य में भाग लेने के लिए सहमत हूँ। मैं इस शोधकार्य में भाग लेने के लिए अपनी स्वेच्छा से तैयार हूँ। मैं पुष्टि करता/करती हूँ कि स्वीकृत देने के लिए मुझे कोई आर्थिक प्रलोभन नहीं दिया गया और न ही दबाव डाला गया है। मुझे इस शोधकार्य का उद्देश्य स्पष्ट कर दिया गया है और मुझे यह विश्वास है कि यह विज्ञान और मानवता के लाभ के लिए है। मुझे इस शोधकार्य में होने वाले जोखिम के बारे में समझा दिया गया है और मेरी समझ में यह जोखिम बहुत मामूली है।

मैं इस शोधकार्य में भाग लेने के सम्बन्ध में किसी भी समय अपनी अस्वीकृति व्यक्त कर सकता/सकती हूँ और मेरे अस्वीकृति व्यक्त करने का मेरे बच्चे के इलाज पर कोई प्रभाव नहीं पड़ेगा।

_____
गवाह के हस्ताक्षर

_____
मरीज के माता/पिता के हस्ताक्षर

तिथि _____

पता _____

_____

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_____
नरीक्षक के हस्ताक्षर

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प्रत्याक्षी के हस्ताक्षर